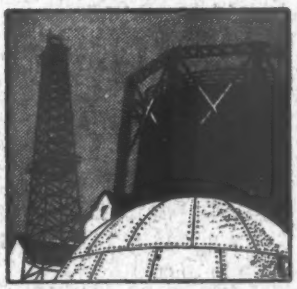
# AMERICAN GAS ASSOCIATION MONTHLY



The Study of Gas Fields
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Nominating Committee Reports for 1930-31

The Present Coke Situation
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Radiant Heat from Radiant Heaters and Its Measurement
F. E. VANDAVEER

*July, 1930*

# Proceedings

The official record of the 1929 Convention of the American Gas Association held in October at Atlantic City is available. Copies can be secured from the American Gas Association, 420 Lexington Avenue, New York, N. Y., at $3.00 to members and $7.00 to non-members.

Also, the proceedings of the annual meeting of the Natural Gas Department of the American Gas Association held at Kansas City, Mo., in May, 1929, can be secured from the American Gas Association, 420 Lexington Avenue, New York, N. Y., at $2.50 per copy.

# AMERICAN GAS ASSOCIATION MONTHLY

**Allyn B. Tunis, Editor**



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# OUR OWN WHO'S WHO

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LXII

## Fred W. Seymour

FRED W. SEYMOUR is president of the American Gas and Power Company, a subsidiary of American Commonwealths Power Corporation, as well as vice-president and assistant general manager of the latter corporation.

Mr. Seymour has won a place among the foremost utility executives of the nation for his organization and engineering ability. He is affiliated with organizations throughout the United States, the aggregate capital of which reaches a figure estimated at more than three hundred millions of dollars.

After receiving preparatory schooling at St. John's Military Academy in Wisconsin, Mr. Seymour was graduated from the University of Michigan in 1909. Following his graduation, he became chemist for a Texas cement firm and in 1914 was employed as a chemist and plant superintendent of the Grand Rapids Gas Company, which employ he left in 1916 to become vice-president and general manager of the Battle Creek Gas Company, at Battle Creek, Michigan. He organized the Federated Utilities, Inc., in 1922, of which he became president, until these properties were sold in 1927. In August, 1927, Mr. Seymour organized the National Gas & Electric Corporation, now a subsidiary of American Commonwealths Power Corporation. Later in 1927, he became associated with American Commonwealths Power Corporation as vice-president and consulting engineer.

Aside from his engineering and organization ability, Mr. Seymour has an exceptional understanding of human nature which gives him an unusual success in his relations with the public.

# AMERICAN GAS ASSOCIATION MONTHLY

VOLUME XII | JULY, 1930 | NUMBER 7


# Sales and Natural Gas to be Important Topics at 1930 Convention

DEVELOPMENT of natural gas having reached such enormous proportions in a comparatively short time, discussion of that subject promises to be one of the notable features of the twelfth annual convention and exhibition of the American Gas Association at Atlantic City, N. J., October 13-17.

At both the general sessions and the sectional meetings practically all of the many problems which present themselves to the industry, by reason of the rapid strides made in program of progress, will be discussed by men who are believed to be the best qualified for this purpose through their years of training and experience.

The steady growth of the gas industry, both in natural gas enterprises and manufactured gas production and distribution today is front-page copy for the nation's daily press. Not only the newspapers but trade papers, including many outside of the gas industry, as well as a large number of popular magazines, have devoted much valuable space to the fact that the oldest of the utilities has expanded phenomenally.

## In Session at Atlantic City

*Move for Conservation*

Not the least of the problems confronting the industry today is the conservation of natural gas. At a conference of the American Gas Association Executive Board, recently held in Atlantic City, unqualified endorsement of the movement by the industry to promote every reasonable measure for the economic and efficient use of natural gas, and the safe-guarding of its supply, as

*These are members of the Executive Board of The American Gas Association, who posed for the above group picture at a meeting recently held in Atlantic City, N. J. They are as follows:*

*Standing, left to right—K. R. Boyes, secretary; Alexander Forward, managing director; B. V. Pfeiffer, J. M. Bennett, R. W. Gallagher, George E. Whitwell, J. L. Conover, F. G. Curfman, Chas. R. Prichard and C. C. Krausse.*

*Seated—O. H. Fogg, F. A. Lemke, Arthur Hewitt, William J. Welsh, treasurer; George B. Cortelyou, B. J. Mullaney, president; C. E. Paige, vice-president; P. S. Young, J. S. DeHart, Jr., F. C. Freeman and Samuel Insull, Jr.*

# Named for A. G. A. Directorate

*W. C. Beckjord*

*J. D. Creveling*

*Raymond Cross*

*H. L. Doherty*

*O. H. Fogg*

*Samuel Insull, Jr.*

*F. A. Lemke*

*A. E. Peirce*

*A. Stockstrom*

proposed at the New Orleans convention of the Natural Gas Department, was given.

This unanimous approval was adopted by the Advisory Council and approved by the Executive Board in the following language:

"The Conference of the Executive Board and Advisory Council of the American Gas Association recognizes this industry's responsibility for the effective conservation of natural gas and unqualifiedly approves the action taken by our Natural Gas Department to this end."

While natural gas topics will play a prominent part in the proceedings, as a whole the convention this year will have a strong sales slant. Prominent men and women have been invited to speak on merchandising from various angles—industrial sales and domestic sales. These features will have equal appeal to both the manufactured and natural gas fields.

Discussion of sales will, it is expected, include the following topics: Advertising, dealer cooperation, competition, reaching the housewife.

*At Work on Program*

Care is being exercised in making up the program to "stagger" the sectional programs in order that all interested in certain subjects may have an opportunity to attend each meeting.

While details of the twelfth annual convention program are not available yet, they will be made public to Association members at the earliest possible time by the General Program Committee, which is made up as follows:

P. S. Young, Public Service Electric & Gas Company, Newark, N. J., chairman.

Joe Carmichael, Iowa Committee on Public Utility Information, Des Moines, Iowa.

Miss Julianne Doane, The Peoples Gas Light & Coke Co., Chicago, Ill.

E. M. Farnsworth, Jr., Old Colony Gas Company, Braintree, Mass.

F. C. Freeman, Providence Gas Company, Providence, R. I.

D. W. Harris, Arkansas Natural Gas Corporation, Shreveport, La.

R. C. Hoffman, Jr., Southern Cities Public Service Company, Atlanta, Ga.

Jacob B. Jones, Bridgeton Gas Light Company, Bridgeton, N. J.

S. W. Meals, Carneige Natural Gas Company, Pittsburgh, Pa.

E. P. Prezzano, Westchester Lighting Company, Mt. Vernon, N. Y.

A. H. Sikes, Great Northern Gas Company, Sault Ste. Marie, Ontario, Canada.

H. Leigh Whitelaw, American Gas Products Corporation, New York, N. Y.

H. W. Hartman, Association Headquarters.

K. R. Boyes, Association Headquarters.

While in session at Atlantic City, the Advisory Council and Executive Board adopted a resolution approving the five-year program of activities of the Association, including industrial and domestic gas research, coordination of activities and concentration of effort, four years of which have been completed. A plan looking toward the continuance of this program over a definite term of years and on a much more intensive scale was approved.

# Nominating Committee Reports for 1930-31

*To Members of the American Gas Association:*

In compliance with Section 2 of Article II of the By-Laws of the American Gas Association, announcement is hereby made to the membership of the following report of the General Nominating Committee which will be presented to the annual convention in Atlantic City, N. J., in October, 1930:

*R. W. Gallagher*

For President — Clifford E. Paige, Vice-president, The Brooklyn Union Gas Co., Brooklyn, N. Y.

For Vice-president — R. W. Gallagher, president, The East Ohio Gas Company, Cleveland, Ohio.

For Treasurer, W. J. Welsh, president, New York and Richmond Gas Company, Staten Island, N. Y.

For Directors—Two-Year Terms: Walter C. Beckjord, Vice-president, The Boston Consolidated Gas Co., Boston, Mass.

*W. J. Welsh*

J. D. Creveling, associate manager natural gas and gasoline division, Henry L. Doherty & Co., New York, N. Y.

Raymond Cross, President, The Ohio Fuel Gas Co., Columbus, Ohio.

Henry L. Doherty, President, Cities Service Co., New York, N. Y.

Oscar H. Fogg, Vice-president, The Consolidated Gas Company of New York, New York, N. Y.

Samuel Insull, Jr., President, Midland United Co., Chicago, Ill.

F. A. Lemke, Secretary and Treasurer, Humphrey Company, Kalamazoo, Mich.

A. E. Peirce, President, Central Public Service Corp., Chicago, Ill.

Arthur Stockstrom, Secretary, American Stove Co., St. Louis, Mo.

Respectfully submitted,

ISAAC T. HADDOCK,
*Chairman.*
ADDISON B. DAY
H. O. LOEBELL
H. L. MONTGOMERY
HERMAN RUSSELL
JOHN K. SWANSON

*C. E. Paige*

The following members have been nominated by Section Nominating Committees to serve as section officers for the next Association year:

Accounting Section: Chairman—John I. Blanchfield, Brooklyn Union Gas Co., Brooklyn, N. Y.; Vice-chairman, Wm. A. Doering, Boston Consolidated Gas Co., Boston, Mass.

Commercial Section: Chairman—E. R. Acker, Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y.; Vice-chairman, Samuel Insull, Jr., Midland United Co., Chicago, Ill.

Industrial Gas Section: Chairman—D. W. Chapman, Peoples Gas Light & Coke Co., Chicago, Ill.; Vice-chairman, A. J. Peters, Consolidated Gas Co. of N. Y., New York, N. Y.

Manufacturers Section: Chairman—E. S. Dickey, Maryland Meter Works, Baltimore, Md.; Vice-chairman, David B. Kahn, Estate Stove Company, Hamilton, Ohio.

Publicity and Advertising Section: Chairman—Donald M. Mackie, Commonwealth and Southern Corporation, Jackson, Mich.; Vice-chairman, R. E. Haas, Columbia Gas & Electric Corporation, New York, N. Y.

Technical Section: Chairman—R. G. Griswold, Cities Service Co., New York, N. Y.; Vice-chairman, I. K. Peck, Midland United Company, Chicago, Ill.

# King Honors Chairman Of British Gas Association

*Sir Francis W. Goodenough*

IN the list of birthday honors conferred by King George occurs the name of Francis W. Goodenough, chairman of The British Commercial Gas Association. This royal recognition of merit brought congratulations from members of the gas industry not only in Great Britain but from this side of the Atlantic.

In an honors list remarkable for names associated with quiet and consistent public service over long periods both at home and abroad, none more truly deserves well of his country and his King than Francis Goodenough. Those who have been closely associated with him through the forty years during which he has served his industry and his country know his work and his worth.

This latest honor is regarded by everyone who knows him as one that has been won, single-handed, by sheer personal merit, energy and consistent purpose.

With no adventitious aid Sir Francis has earned a great and growing public reputation, and now the signal distinction from his sovereign, while at the same time making a great host of friends.

Born at Newton Abbot, Devon, in 1872, he entered the service of the Gas Light & Coke Company of London at the age of sixteen. He has now spent forty-one years in the service of the company, twenty-six years of which he has been in charge of the Public Service Department. During this period service to the public has been raised to a standard generally regarded as an example to public utility undertaking.

He was one of the founders of the British Commercial Gas Association, in 1912, and has been its executive chairman ever since. He also was chairman of the British Empire Gas Exhibit at Wembley, and for his work in this connection was awarded the C.B.E. in 1926. He has been joint honorary secretary of the National Gas Council for twelve years, was six years a member of the Council of the Institution of Gas Engineers, and has been an international member of the American Gas Association for seventeen years.

But it is in the field of business administration and salesmanship that Sir Francis has attained worldwide renown. On the invitation of Lord Eustace Percy, then president of the Board of Education, he was invited to act as chairman, and to form a Government Committee on Education for Salesmanship, in June, 1928. When the Labor Government came into power the Goodenough Committee was reappointed by Sir Charles Trevelyan. As chairman and leading spirit of this committee Sir Francis has done notable work for British Commerce and Industry, and he sponsored the Interim Report on "British Marketing Overseas" which his committee brought out last year.

For three years he was chairman of the Incorporated Sales Managers Association of Great Britain and Ireland, during which time it has greatly increased its standing and activities. This year he is president of the association and also is president of the British Export Society.

He has delivered speeches throughout England, and has also broadcast, on the subject of marketing British goods. His opinions on the subject of salesmanship are justly regarded in Great Britain as weighted with the authority begotten by experience.

Sir Francis has been applying his conviction that industry needs specially trained men for many years within the gas industry. He was one of the originators of the Gas Education Scheme, and has been for seven years chairman of the Gas Education Committee of the Institution of Gas Engineers.

But though his main interest, it might almost be said his passion, is salesmanship, Sir Francis has many and varied interests outside. He has given lectures before the Royal Society of Arts, and for many years has supported the work of bodies as diverse as the Natural Art Collections Fund, the Architecture Club, the Royal Sanitary Institute, the British Institute of Social Service, the English Speaking Union, and the Pilgrims' Society. In his spare time he fishes, golfs and motors.

Truly an active man in every sphere, but especially in the field of business efficiency, and one who richly deserves the honor which has been conferred upon him.

# Preeminence of Gas In Heating Field*

By WILLIAM J. WELSH
Treasurer, American Gas Association

ON all sides we are besieged with queries relative to the gas industry—"why," "what" and "where" are the words that preface almost every question. When the gas industry was headed, as many eminent economists apparently believed, about thirty years ago, for the industrial scrap-heap, due to the ascendancy of the electric light, many, with typical American indifference for failure turned eyes and attention to the newcomer. The habiliments of romance soon slip from the shoulders of the has been. A number of our larger combination companies began to dispose of their gas properties.

It would be embarrassing to mention names, for these very same companies are now seeking gas property investments, both in the manufactured and natural gas field. To the layman this may appear as a sudden about face, but to those of us who have been in the battle front of the gas industry for the past decade, the progress of the industry has been most apparent and steady.

Undoubtedly the growth in the natural gas industry has given much of impetus and romance to the situation, but back of the growth of the gas industry, and probably of greater importance to and responsibility for it, is the program of research work in both industrial and domestic utilization and operation that is being conducted by the American Gas Association. Four years of a five-year program of thoroughly coordinated research in every phase of gas production, transportation, distribution and utilization, are almost completed, and at a recent meeting of executives of the gas industry, continuance of this program of cooperative research work on even more extensive and intensive scale was unanimously adopted.

In addition to this research program, the industry, also under the leadership of the American Gas Association, sponsored and financed the development of the A. G. A. Testing Laboratory at Cleveland, Ohio, the only institution of its kind operated by such an association, where a five-year program of work has been going on in the testing of gas-consuming appliances for safety and efficiency—until today it is almost impossible to market a gas appliance that does not bear the Laboratory Seal of Approval. Our studies and experiments in the industrial usage of gas have produced most amazing results, there being now about 12,000 industrial uses for gas—uses where gas has been proven more economic and more efficient than any other type of fuel.

What has been going on in the gas industry during the past five to ten years? In this period we have distributed more manufactured gas than had been made before in all the years since Murdock, Winsor, Lebon and other pioneers originated the industry in the early part of the nineteenth century. This growth, tremendous as it seems, has been made in spite of the fact that the industry has been transformed entirely from a lighting industry to a heating industry.

Today the industry is not only preeminent in the field of heating, both for the home and rapidly dominating the industrial heating field, but it is coming to be looked upon as the next dominant factor in the field of both wholesale and domestic refrigeration. Already manufacturers who heretofore have made electrically operated refrigerators exclusively are preparing to enter the field of gas-operated refrigerators. Then just around the corner is house-cooling by gas. Indeed, the gas industry was not on the road to the industrial junk-heap, neither has it been sleeping—it has been very busy through this period of research and coordinated activity in every branch, finding itself and mapping its course, for many years of future progress and growth.

The best evidence of the justification of this course and the results that have been obtained is the lively interest now being taken in the gas business by almost every investment banking house of any importance—the remarkable impetus given to the long-distance transportation of natural gas, for many years a drug on the market, which is now going in all directions from the rich natural gas areas of Louisiana, Texas, Oklahoma, Kansas and California, into middle western, southwestern and Pacific Coast cities that have hitherto been manufactured gas markets—and also the growing problems of mixed gas and propane and butane enrichment.

On a basis of invested capital this gas industry is now some hundred and fifty million dollars better than a five-billion dollar industry. Natural gas enterprises account for something more than a third of this investment, and they produced about 42 per cent of the total revenue last year. The increase of manufactured gas sales over the past ten years has amounted to about 500 per cent. The natural gas output of the country in 1929 was approximately two and one-half times the output of 1922, seven years before, and the increase last year over 1928 was better than 20 per cent.

A few weeks ago B. J. Mullaney, president of the American Gas Association, made a comparison of the gas and electric business, which to me was very illuminating, in that it enables us to gather some idea of the potentialities of this great industry, when he reduced the two forms of energy, kilowatts and cu.ft. to a common denominator—therms. He said: "The energy distributed as natural and manufactured gas in the United States in 1929 amounted to 28 billion therms. That was the energy equivalent to 835 billion 300 million (835,300,000,000) kilowatt hours of electricity, more than nine times

(Continued on page 330)

*Digest of address delivered before the Metropolitan Section, National Electric Light Association, June 6, 1930.

# The Study of Gas Fields*

By E. L. Rawlins†

THE natural gas industry has become one of the great industries, and its expansion has stressed the importance of the many problems dealing with the design of equipment in the field and throughout the distributing system and with the efficient operation of these complex systems. The proper development and maintenance of gas-producing areas, the development of new markets, the construction of facilities to transmit the gas from the fields to the markets, and other construction and maintenance necessary to satisfy both domestic and industrial consumers have necessitated the investment of large sums of capital. The natural gas business is a utility business, and the gas companies not only have to obtain earnings on their investment but they have the moral duty of supplying consumers, regardless of cost, when necessity demands it. Satisfactory net earnings on invested capital over a long period is possible only by practicing strict conservation of natural gas and continually studying the problems of producing, transmitting and distributing the product. As the industry has grown and expanded the complexity and importance of certain problems connected with it here changed accordingly. An adequate gas supply is essential before investments can be made in transmission and marketing facilities. In order to secure more efficient operation and to conserve the gas and prolong the life of the properties, sound engineering principles, based upon detailed study, must be applied to methods of drilling, cementing, completing wells, casing, tubing, and other phases of gas production. The intensive study, first, of individual gas well characteristics; second, of a gas field; and third, of a group of gas fields which is the source of supply for any particular system of interconnection transmission lines furnishes information that is valuable to any large operating gas company. One factor that has stressed this importance is the construction of long-distance, high-pressure pipe lines. With a limited market requiring a relatively small transmission system, which represents a limited investment and a small operating capital, a general estimate of the total reserves is adequate. However, for markets far removed from gas-producing areas which require large pipe-line projects and which involve the expenditure of considerable money, there is need for a much more careful study of gas fields. Water encroachment possibilities are more serious; reserve estimates must be based upon sound facts and logic; the ability of individual gas wells to deliver gas under any pressure conditions and the combination of individual wells to secure the best results under peak-load conditions should be studied; knowledge upon which to base a record of the producing condition of a gas well at any time is needed, and the gas well should be kept in its most efficient operating condition; the differentiation between gas delivered to market directly by well pressures and gas that has to be pumped is an important economic problem; the proper control of gas-well deliveries with back pressures to eliminate water encroachment and sand troubles and to prolong the producing life of the wells is an important operating problem; and there should be considerable more knowledge of the physical properties of gases. In reviewing the various intensive investigations that have been made in the natural gas industry, it is surprising to find how much the studies of facilities and operation from the well-head connections to the consumer overshadow the studies of underground conditions. In the transmission of gas through pipe lines and the distribution to the consumers, researches into the flow characteristics of the gas and other basic problems have received considerable attention. However, little real investigative work of which results could be used as a basis for the flow characteristics of the gas from the producing sands into the well has been done.

*E. L. Rawlins*

It is not possible in this paper to discuss the many ramifications of such a subject as "The Study of Gas Fields." The discussion, therefore, will be limited primarily to individual wells and fields, the flowing characteristics of the gas in the sand and the producing string which influence reserve estimates, the availability of the gas in the sand, and the factors that are important to the operation of the entire production, transmission and distribution system.

### *Production of Natural Gas in the Southwest*

Many of the major projects of construction of long-distance transmission lines during the past few years have originated in the fields of the southwest. It is interesting to know that in 1928 approximately 1,568,129 millions of cu.ft. of gas were produced in the United States as marketable gas; and of this amount, 850,672

* Read by permission of the Director, U. S. Bureau of Mines, before the Convention of the Natural Gas Department of the American Gas Association at New Orleans, May 5, 6, 7, and 8, 1930.

† Natural Gas engineer, U. S. Bureau of Mines.

millions of cu.ft. or 55 per cent of the total were produced in Louisiana, Oklahoma, and Texas.‡ Preliminary estimates for 1929 indicate a total production of at least 1,900,000 millions of cu.ft., § and probably a large part of this gas was produced in the three southwestern States. Each of these three States has large gas fields with reserves for years to come in addition to numerous smaller gas areas more or less associated with the production of oil. When such natural gas sources as the Richland, Monroe, Oklahoma City and Panhandle fields are considered, and in many other smaller but valuable sources, the expansion of the industry to create additional large markets can be understood. Likewise, the study of the sources of supply becomes increasingly important.

### *Estimation of Natural Gas Reserves*

The estimation of natural gas reserves requires the combination of a small amount of mathematical and fundamental knowledge and a considerable amount of common sense. The ability to realize the pertinent factors applicable to any particular project and to account for these factors in a logical manner is necessary. A few of the principles of estimating reserves have been discussed in various papers and reports.‖ The two methods of estimating reserves of gas most commonly used are the saturation method and pressure-volume method.

The saturation method is based upon calculating the actual volume of gas in the sand at any rock pressure (preferably the original rock pressure in the sand) from the porosity of the sand, the thickness of the sand, and the productive area. In other words, the actual volume of gas occupied in the total pore space in the sand is calculated. The calculation is based upon the following formula:

$$V = A\,t\,p\,P_1\,P_o'$$

Where $V$ = volume of gas contained in the sand, expressed in cu.ft. at atmospheric pressure,
$A$ = total productive area of the field, sq.ft.
$t$ = thickness of the sand, ft.,
$p$ = porosity of the sand, per cent,
$P_1$ = absolute rock pressure, lbs. per sq.in.
$P_o'$ = atmospheric pressure, lbs. per sq.in.

If the calculation is based upon the original rock pressure, the difference between this volume of gas and the volume that has been produced since these conditions existed represents the volume of gas remaining in the sand.

The pressure-volume method of computing gas reserves is based on the decline in rock pressure and the volume of gas produced from the sand during a particular decline in rock pressure. The volume of gas remaining in the sand after a decline in rock pressure from $P_1$ to $P_2$ is as follows:

$$V = V_p \frac{P_2 = P_t}{P_1 = P_2}$$

Where $V$ = volume of gas in the sand at the rock pressure,
$P_2$ = expressed in cu.ft. at atmospheric pressure,
$V_p$ = volume of gas produced during a decline in rock pressure from $P_1$ to $P_2$,
$P_1$ = initial rock pressure of the decline,
$P_2$ = final rock pressure of the decline,
$P_t$ = pressure in the sand at which flow from the sand will cease.

The volume-pressure method of estimating gas reserves can be illustrated in another way. Since it is assumed that the decrease in actual volume is proportional to the decrease in rock pressure, if the rock pressure has decreased 10 per cent from the original, a volume of 10 per cent of the original volume has been taken from the sand and 90 per cent of the original volume remains in the sand.

### *Recoverable Gas*

Both the saturation and pressure-volume methods of estimating gas reserves are based upon Boyle's law, which states that with a constant temperature the volume of gas varies inversely with the pressure. The strict mathematical application of the two methods, therefore, is for perfect conditions only; that is, the actual volume of pore space in the sand remains constant for the life of the field; the gas is such that it complies strictly with Boyle's law at all conditions of pressure and volume; the gas itself does not change as the field grows older and gas is produced from it; and other conditions are assumed that do not apply strictly in the different gas fields. All factors that have any influence on the production of the gas are therefore considered carefully in making estimates. In addition, it is necessary to study a gas area constantly; and if conditions for the basis of the original estimate are changed, revised estimates are made in time for revision of operating conditions.

The consideration of the encroachment of edge water is of particular importance, especially if the pressure-volume method of estimation is used. This encroachment actually decreases the volume of the reservoir. The effect of the water pressure increases as the gas pressure declines; therefore, the rate of decrease of the volume of the reservoir is more rapid at lower rock pressures. If original estimates of gas reserves are based on only a short period in the life of a gas area and there is edge water under a relatively high head of pressure in the producing sand, the estimate of the original volume of gas in the sand is high. In other words, the actual volume of gas produced from the area per pound decline in rock pressure is not constant but lessens as the rock pressure declines. This is true because the assumption is made that the actual volume of the reservoir remains constant for a definite pressure drop, whereas it actually is less at the lower pressure of a pressure drop.

The gas usually is in the reservoir at high pressures. Under such conditions, Boyle's law is not strictly applicable. There are more cu.ft. of atmospheric gas in the reservoir than Boyle's law indicates. The deviation is greatest at the maximum pressure and decreases as the pressure decreases. If volume of gas produced is plotted as abscissae against pressure in the sand as ordinates, the actual cumulative

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‡ Hopkins, G. R. and Backus, H., Natural Gas in 1928. Mineral Resources of the United States, 1928. Part II. Bureau of Mines. Published March 26, 1930. p. 378.

§ Struth, H. J., 1929 Natural Gas Production nearly two trillion cu.ft. Natural Gas, Jan., 1930, p. 5.

‖ Brandenthaler, R. R., Economic and Engineering Problems in Estimating Natural Gas Reserves, Oil and Gas Jour., June 30, 1927, p. 40.

Brandenthaler, R. R. and Campbell, E. P., Supplemental Engineering Report on Chickasha Gas Field, Grady County, Okla. Distributed by U. S. Bureau of Mines, Bartlesville, Okla. 38 pp.

Davis, Ralph E., Estimation of Natural Gas Reserves. Oil and Gas Jour. June 16, 1927, p. G-125.

Parsons, C. P., Accurate Estimates of Gas Reserves. Oil and Gas Jour. May 10, 1928, p. 86.

Weymouth, T. R., Economic Aspects of Natural Gas Projects. Am. Gas Assoc. Monthly, December, 1929, p. 747; Natural Gas, December, 1929, p. 3.

Bauer, C. Max., Gas Big Factor in Texas Panhandle. Oil and Gas Jour. Dec. 1, 1927; p. 48-49; Oil Field Engineering, April, 1928.

production curve is flatter at higher pressures when compared to the estimated cumulative production curve and gradually becomes steeper at lower pressures. The total cumulative production is greater than the estimated cumulative production.

In using either method of estimating reserves, correct rock pressures are essential. First, enough wells should be "closed-in" for a sufficient length of time to insure conditions of equilibrium in the sand. Second, the pressure due to the weight of the column of gas should be added to the pressure observed at the well head to determine the true rock pressure in the sand. This item, sometimes, is of considerable importance. For instance, a gas well with an absolute pressure at the well head of 1,000 lbs. per sq. in., a depth of 2,500 ft. with a gas of specific gravity of 0.7 has a pressure due to the weight of the column of gas of approximately 89 lbs. per sq.in.

In many gas fields the apparent closed-in pressures on gas wells located in different parts of a field vary. Also, the actual rate of production under the same pressure conditions are different for the different wells. Under such conditions, one plan is to estimate the reserve by subdividing the field into different areas and considering each area a separate unit. The subdivision depends upon the conditions in the field, and wells with approximately the same rock pressures should be included in their respective areas. The total volume of reserve gas is the sum of the reserves for all of the areas. Another method of estimating reserves under conditions of non-equalized rock pressures is to determine the weighted average rock pressure of the producing sand and then calculate the reserves by use of the pressure-volume method. The field is divided into a large number of small subdivisions. The ratio of the area of each small subdivision to the area of the field is multiplied by the average rock pressure of each subdivision, and the sum of these products is the average weighted rock pressure for the entire field.

There is a good deal of difference between the actual volume of gas in a producing sand and the volume of gas that can be produced profitably from a sand. The gas that can be produced from a sand is termed "recoverable gas."

The factors peculiar to any particular gas field are considered when making estimates of reserves as a basis for a project, and an economic pressure to which the reserve is limited is selected. For instance, a field might have an average rock pressure of 700 lbs. per sq.in. at the time a reserve estimate is made. The economic pressure below which this field could not be operated profitably might be 70 lbs. per sq.in. Thus only 90 per cent of the total volume of gas in the sand can be recovered profitably.

Another factor of importance is the differentiation between recoverable gas and deliverable gas. All of the gas recovered from a producing sand is not delivered to a market. In many cases, the deliverable gas, due to local operating conditions and influences beyond the control of the gas company, is not more than 50 per cent of the recoverable gas. This item should be considered carefully. The presence of an oil-producing sand in the same horizon with the gas-producing sand is one illustration of this condition. The development of the oil field, under present practice, limits the volume of deliverable gas to only a small percentage of the recoverable gas. It is poor policy for a gas company to risk a huge investment in pipe-line facilities under such conditions. The natural-gas department of the A. G. A. has initiated an important conservation movement in the appointment of a committee to cooperate with the oil producers to effect a saving in the gas lost in the production of oil. Such a saving would be immense and would insure a reserve of gas even in this southwest country to warrant an expansion in pipe-line facilities that could hardly be estimated at this time. It is surprising how few strictly gas fields are located in Texas, Oklahoma, and Louisiana. Combination gas and oil fields, however, are numerous.

### *Casinghead Gas Reserve Estimates*

A reliable estimate of gas reserves when the gas is produced with oil is a difficult problem. Gas companies can not curtail the rate of production to satisfy requirements of their pipe-line facilities, but the rate of production is dependent largely upon the rate of production of the oil. As a result, the analysis of the gas reserves is related closely to the reserve study of the oil production. A detailed study of subsurface conditions, the casing program, sand formations, and water encroachment problems has to be made carefully. The operating policies of each company in the field are of importance. The drilling program outlined by the companies gives a basis for estimating the future rate of production of both oil and gas from the field. As explained previously, there is a difference between the volume of gas that can actually be recovered from the sand and the volume that can be delivered to the consumers. Cognizance has to be taken of the amount of gas that will be used for fuel and drilling purpose, for gasoline plant shrinkage, and for excess gas that will be produced with the oil that can not be handled by the pipe-line facilities of the gas company. All of these factors influence an estimate of the actual producing life of the field.

### *Availability of Gas*

The estimate of the reserves in a gas-producing area forecasts only the total volume of gas that can be recovered from the sand. Such an estimate of total recoverable gas fails to give a clear and definite picture of the availability of the gas in the later producing life of the field and leaves many engineering problems unsolved. For instance, a gas field might be operating at an average rock pressure of 700 lbs. per sq.in. and be able to deliver into the pipe lines under peak load conditions 50,000,000 cu.ft. of gas per 24 hours at a back pressure on the wells of 95 per cent of the rock pressure or 665 lbs. per sq.in. Some of the questions which naturally arise with reference to this field are: What back pressure will likely have to be maintained on the wells to produce this same peak load after the rock pressure has declined to 500 lbs. per sq.in.? When will compressor facilities have to be furnished and what facilities will be needed? What should be the drilling program for future gas wells to maintain a desired rate of delivery at a high back pressure? What is the economic limit as regards the productive life of the field between the number of wells that

should be drilled and the installation of pumping facilities in the later life of the field? What factors influence the producing characteristics of individual wells in their later productive life, and how can these influences be detected and remedied? Axiomatically, if these factors and influences are determined for the individual wells of a field, the solution of the problems of the field may be reached.

The natural-gas department of the American Gas Association has an open-flow committee working in cooperation with the Bureau of Mines on the problem of gauging gas-well capacities. So far, the primary objective of this study has been to find methods of gauging gas-well capacities so as to eliminate the necessity of blowing wells wide open into the atmosphere to obtain open-flow readings. The elimination of this feature of gauging will reduce losses of large quantities of gas, protect gas wells from water encroachment due to "coning" when they are opened wide, protect the sand in the well from caving on changing its characteristics, reduce the hazards of fire and wild wells, and reduce the hazards to employees who have to gauge the large gas wells. It has been found that for dry sand and unconsolidated formations a gauging test can be conducted in the following manner. First, "shut-in" the well and obtain a reading of the shut-in pressure at the well head; then, obtain four or five measurements of the rates of flow of gas from the well at each of the four or five corresponding back pressures. These back pressures should be a high percentage of the shut-in pressure. It is not necessary to reduce the back pressure to less than 80 per cent of the shut-in pressure. After calculating the actual pressure at the sand for each reading, then plot on logarithmic paper the rates of flow as abscissae against the respective differences between the squares of the shut-in pressure at the sand and the back pressures at the sand face. A straight line can be drawn through the plotted points, which show the characteristics of the flow of gas from the producing sand into the well. This relation in reality is a calibration of the capacity of the sand immediately surrounding a well to deliver gas into that particular well under any conditions of pressure. The depth of penetration, the size of bore, the method of finishing the well, and the character of the sand influence this calibration. If no changes occur in the well, in the sand, or in the character of the gas this relation should be applicable for the producing life of the well.

It can thus be seen that the question of gauging gas-well capacities is really more than a study of the measurements of "open flow." Data already have been obtained in the operation of wet gas wells, wells subject to water encroachment, and under either operating conditions which suggest the application of these principles to "check up" on certain wells so as to forecast the deviations from what ordinarily would be expected in the operation of dry gas wells. This was illustrated clearly by a gas well which for two years steadily increased in its water production. Quarterly tests on the well showed that the capacity of the well to deliver gas under a definite set of pressure conditions decreased. The following results were noted:

| *Difference between the squares of the formation and back pressures* | *Rates of flow M cu.ft. per 24 hours* |
|---|---|
| 100,000 | 2,400 |
| 100,000 | 2,350 |
| 100,000 | 2,210 |
| 100,000 | 2,150 |
| 100,000 | 2,010 |
| 100,000 | 1,900 |

Conditions in gas fields vary, of course, and it cannot be expected that the same relation between the rate of flow and the difference of the squares of the formation and back pressures will be strictly applicable at all times in the producing life of a gas well. This is one particular phase of the gas well problem that will be investigated. However, the principle is a basis upon which certain features of a contemplated project can be studied.

It is desirable to operate a gas field with the highest back pressure on the sand as is economically possible. This back pressure on the sand is greater than the inlet pressure to the transmission lines by the amount of pressure due to the weight of the column of gas and the friction drop between the sand and the inlet to the pipe line. The capacity of a section of the pipe line, in turn, is approximately proportional to the inlet pressure, provided that the outlet pressure is less than half the inlet pressure. Therefore, operation of gas wells at high back pressures helps the capacities of the pipe lines under peak-load conditions, especially for long-distance markets. There is, however, an economic balance between the amount of drilling that should be done in a gas field to maintain a larger availability of gas at higher pressures, and the installation of pumping facilities to increase the pipe-line capacities while actually taking gas from the field at lower back pressures. The spacing of gas wells is a problem that needs considerable study. There are few fundamental available data on the subject. It is possible to drill too many wells in a gas producing area, which would be detrimental to the producing life of the area. Most recommendations are that wells should not be drilled to drain less than a 40-acre productive tract. The Department of Conservation, State of Louisiana, takes the drainage area of wells into consideration in formulating its permissible withdrawal regulations.

The question of drilling and maintaining high back pressures is closely related to the problem of differentiating between pumped and non-pumped gas. The problem is comparatively simple for a market close to a gas field and a simple transmission system. During the earlier life of the field, pumping would be required. The amount of pumping necessary probably would increase as the field grows older, depending upon the drilling program in the field. After the field is drilled up in accordance with the best recommendations of well spacing and the field continues to grow older, more pumping is required to transmit the gas to the market. In such installations it is possible to obtain a fairly reliable estimate of the amount of gas that has to be pumped in a year.

This problem becomes much more complicated for some production and transmission systems. A large operating company in order to serve its consumers satisfactorily must maintain a complicated interconnecting system of transmission lines from numerous gas fields with different producing conditions. Some of the markets are located near sources of supply and some far away from any source of supply.

The lines are so constructed that the company is "ready to serve" to consumers under any operating conditions. In such an installation, the pumping of the gas is separated into two classes; first, the pumping necessary to put the gas into the inlets of the different sections of the transmission system from the gas fields; and second, the compression of the gas in the transmission system to high pressures after the pressure has decreased due to the flow through the pipe lines.

From the standpoint of production, it is customary to classify as "pumped gas" only that gas which has to be compressed to higher pressures to put it into the transmission lines from the fields. It is possible to maintain a fairly accurate record of such gas. However, the gas that is compressed in the transmission system is extremely difficult to record. Weather changes are so sudden at times that the demand might double, and it is then necessary not only to change the operating conditions in the fields but to use the compressors on the pipe lines. This might last only for a limited time. The question of how much gas is actually pumped under such conditions is difficult to answer. In the summer time, when demands on certain sections of the pipe lines are light, compressors on the pipe lines are not necessary and the compressor stations can be bypassed. At the same time, the pressures in certain of the gas fields might be such that pumping at the field would be the best method to provide the necessary pressure at the inlet of the pipe lines, which would eliminate the need of compressors on the main transmission system. This, too, is made possible more easily by so controlling the gas-well production that the most economical back pressure is maintained in the field.

The fluctuations in the quantities of gas that are transmitted through a system of pipe lines are, of course, related to the quantities that have to be produced from the gas fields. When more compressors on the pipe lines are working to increase the total quantity of gas flowing through the pipe lines, more gas necessarily is being produced from the gas fields. If no additional gas wells are used to supply this additional gas, the average inlet pressure to the transmission system is decreased. For practical purposes, the capacities of sections of lines from the gas fields are approximately proportional to the inlet pressures to the lines, provided the discharge pressures on these sections are less than half the inlet pressures. Therefore, if the demand on a transmission system suddenly increases and this additional gas is taken from one field without using any additional gas wells, it is possible for the back pressure on the wells to decrease 20 per cent. This means a decrease of 20 per cent in the capacity of the line from the field which really has to be able to have more gas flow through it. Either of three methods then are utilized to get the gas to the market; first, using more compressors on the transmission system; second, using more wells in the gas field, thus increasing the back pressure on the field and increasing the inlet pressure to the pipe line, which in turn requires less compression on the pipe line than for the first case; and third, actually increasing the pressure at the inlet of the pipe line by pumping between the fields and the pipe line. There are times, of course, when either one, a combination of two, or all three methods have to be used.

Accounting methods necessarily demand that the pumped gas at the field and the compression of the gas in the pipe line system be considered separately, but these items are closely related as far as operations are concerned. The knowledge of the availability of gas from the different wells in the different fields and the study of these availabilities to satisfy operating conditions can influence the operation of the entire gas system. All of the facilities are essential to maintain the highest ability for "readiness to serve," upon which any gas company prides itself. The results of further studies that have been suggested should even increase this readiness.

### *Effect of Water Upon Availability of Gas*

The presence of water in a gas well decreases the ability of that well to deliver gas under normal operating conditions. This condition is not limited primarily to small gas wells, as has been thought, but also effects large gas wells. There has been a good deal of agitation by many of the operating companies on the subject of the provision of some method of keeping water away from large producing wells by using back pressure and never opening the well wide so as to allow the water to come in. There are exceptions, of course, where conditions might be such that the operator would want to clean the well by blowing. The studies that have been made of the use of tubing and other methods of eliminating water trouble are to be commended.

### *Conclusions*

Although in this paper the discussion of availability of gas is based upon actual tests of gas wells in a gas field, it is realized that the conditions of operation are more favorable than will be found in other gas fields. The more rapid encroachment of edge water, the variations of actual formation pressure in the same field, the changes in the character of the sand, and other variations cause deviations from any forecasts that can be made. However, with such a basis for reasoning and the application of knowledge obtained through experience, more accurate analyses of field conditions are possible.

It has not been possible, with the present progress of the study of gas-well gauging, to give a complete and detailed discussion of gas fields, especially in regard to the availability of gas. The many variations in operating conditions and in the actual fundamental differences in the different fields needs further intensive study. An attempt has been made, however, to bring possibilities that can be considered to the attention of those engaged in the natural gas industry. The open-flow committee of the natural gas department of the American Gas Association now has a problem which, if broadened and studied carefully and intensively, should give valuable information regarding all phases of natural gas production. The fundamentals of actually gauging gas-well capacities not only to determine production under "open flow" conditions but under any conditions of pressures will apply to such problems as the availability of gas, storage of gas in depleted sands, control of gas wells, estimation of gas reserves, and to many other problems that are important in the natural gas industry.

# The Present Coke Situation*

*Paul Ryan*

By PAUL RYAN,
Statistician, American Gas Association,
New York, N. Y.

NO study of the coke situation during the past year would be complete without some consideration of the general factors underlying the entire field of the fuel economics, as we are all aware that coke is but one of the many competitive fuels constituting the heat resources of the nation.

Of these various competitive fuels, bituminous coal is of course basic, since changes in this industry inevitably affect the entire field of fuel economics. The production of this fuel in 1929 amounted to 532 million tons, an increase of 7 per cent from the preceding year. Partly in response to this increased production and partly because of the continued decline in the general level of wholesale commodity prices, bituminous coal prices declined during 1929, average prices for the year, as measured by the index of the United States Bureau of Labor Statistics, ruling about 2.7 per cent below the preceding year, reaching the lowest levels since 1916.

Anthracite production in 1929 amounted to almost 77 million tons, or approximately the same figure as for the year previous, while prices showed no appreciable change.

The production of crude petroleum increased by more than 10 per cent during the year, output approximating more than one billion barrels. The consumption of crude petroleum increased by nearly 8 per cent, while average prices gained about 10 per cent during the year.

Of much greater significance, however were developments occurring in fuel oil, where production in 1929 amounted to 448 million barrels, or an increase of 5 per cent over the preceding year. At the same time stocks of fuel oil averaged 3 per cent higher during 1929, with the result that average fuel oil prices for the year declined by 11 per cent from the levels prevailing during 1928.

During 1929 the total production of by-product and beehive coke amounted to nearly 60 million tons, an increase of 13 per cent over the preceding year. Nearly 90 per cent of this amount was by-product coke, the production of which amounted to over 53 million tons in 1929, representing an increase of 10 per cent over the preceding year. This compared with a production of 6 million tons of beehive coke which represented an increase of nearly 26 per cent from the previous year.

It may be of interest to consider these developments in their effect on the manufactured gas industry itself.

While final figures for the year 1929 are not yet available, preliminary estimates indicate that for the third successive year, the production of water gas decreased, the decline amounting to about 9 per cent for the year 1929.

The production of retort coal gas also declined by about 10 per cent, but coke oven gas produced in plants owned by public utility companies increased some 28 per cent, while coke oven gas purchased from sources outside the industry, such as merchant by-product coke oven plants and concerns affiliated with the iron and steel industry, registered a gain of nearly 30 per cent.

You will undoubtedly be interested to know that these same general trends are operative throughout the present year. According to a compilation just completed of Companies replying to the Association's monthly questionnaire, and representing about 90 per cent of the manufactured gas industry, during the first three months of 1930 the production of water gas decreased by some 6 per cent, as compared with the corresponding quarter of 1929.

During this same quarter the production of coal gas dropped nearly 2 per cent, and coke oven gas produced increased about 5 per cent, while coke oven gas purchased from sources outside the industry, that is non-utility plants, continued to increase at a rate of about 17 per cent.

The above data may be summarized as indicating a pronounced and increasing trend on the part of the industry, as a whole, toward the substitution of coke oven gas for water

(Continued on page 322)

## Fuels—
## Gas, Coal, Coke, Oil

**Production of bituminous coal increased 7% in 1929 over 1928.**

**Prices of bituminous coal declined in 1929 2.7%.**

**Anthracite production and prices in 1929 were practically unchanged.**

**Production of crude petroleum increased more than 10% in 1929. Consumption increased 8% and prices gained 10%.**

**Production of fuel oil increased 5% in 1929 and prices declined 11% under 1928.**

**Production of by-product coke increased 10% in 1929 and production of beehive coke increased 26%.**

**Water gas production decreased 9% in 1929 under 1928, this being the third successive year of decline.**

**Production of retort coal gas declined in 1929 about 10%.**

**Coke oven gas produced in public utility gas plants increased 28% in 1929.**

**Coke oven gas purchased from sources outside the industry for distribution increased nearly 30% in 1929.**

**Preliminary estimates indicate that for the first three months of 1930 the production of water gas has decreased 6%, compared with the corresponding quarter of 1929.**

**For the same quarter of 1930 production of coal gas dropped nearly 2%.**

**For the first three months of 1930 production of coke oven gas in manufactured gas plants increased about 5%.**

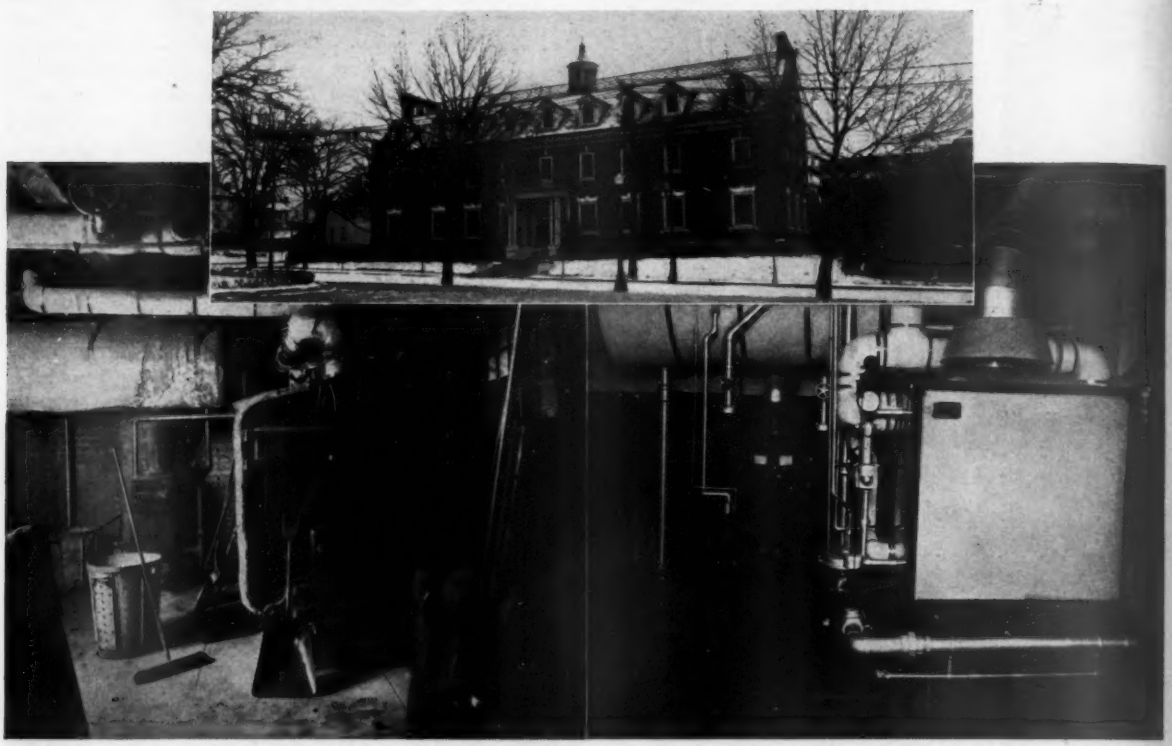
**For the same period of 1930 coke oven gas purchased outside the industry increased about 17% over the same quarter of 1929.**

**In the decade 1919 to 1928 bituminous coal consumed by the manufactured gas industry increased 15%, oil increased 1%, anthracite decreased 78%.**

**Coke consumed by the manufactured gas industry in 1928 increased 180% over 1919.**

*Paper presented before the Joint Production and Chemical Conference, Hotel Cleveland, Cleveland, Ohio, May 21-22-23, 1930.

# City Building Installs Gas



*(Top) A view of the Mount Vernon Police Station; (bottom) a vivid contrast between old and new methods of heating this municipal building. It almost is necessary to indicate which is the gas equipment—the pictures themselves are an eloquent argument for the new system of heating with the ideal fuel.*

THE first municipal building in Westchester County, New York, to be heated by gas is the Mount Vernon Police Station and City Jail, located at Roosevelt Square. Installation of the new heating equipment took place in mid-winter and was attended by several interesting features.

On the last day of 1929, the House Heating Division of the Westchester Lighting Company received an order to install the equipment. On the first working day of 1930, a 4-GS-10 gas-fired boiler, a product of the American Radiator Company, was delivered.

Within five days, a larger gas service main had been run in from the street, a distance of about eighty feet. On January 8, the boiler was assembled and set up in the basement alongside the coal boiler that was to be replaced.

On the morning of January 9, the actual work of replacement began. The coal fire was "dumped" and the steam and water connections and flue pipe of the old boiler "broken." The old boiler was then put on skids and moved to the opposite side of the basement. The new boiler—approximately half the size of the old equipment—was set on rollers, and after having been lined up to the correct position, was let down to the floor by means of ordinary automobile jacks.

The steam, water and flue connections were thereupon made and boiler encased, and before midnight the building was being heated by gas.

During the afternoon, and up until the time the gas boiler was functioning, electric heaters that had been loaned by the company were used in the cell blocks and in the desk sergeant's office.

About a week later the coal equipment for heating water was likewise replaced with a gas unit, and the boiler room cleaned and painted to make a model basement. The old coal bin has been converted into a fine, light and cheerful workshop where traffic signs are painted and traffic lights repaired.

The entire new gas heating system, thermostatically controlled from the desk sergeant's office, provides all the refinements of automatic equipment.

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## More Gas for Househeating in New England

AS an indication of the increase in the use of manufactured gas for house heating in New England, reports from thirty-six companies for January, 1930, show that 15 per cent of all gas sold was used in house heating during that month.

# Use of Activated Coal For Purification Of Coal Gas

By EDWARD A. DOW*

THE advantages claimed for activated coal as opposed to dry purification methods are a more complete removal of sulphuretted hydrogen and a greater speed of reaction. Sulphuretted hydrogen is oxidized during the process to water and sulphur. At the content of about 10 grams of sulphuretted hydrogen to one cubic meter of gas, which is the usual ratio in the case of German coal, the heat of the reaction causes a rise in temperature of 30° or at the most 40° C. As a result, sulphur is not melted but is deposited in the capillaries of the activated coal. Good grades of activated coal can hold from 400 to 600 kilograms of sulphur per cubic meter of activated coal, which cubic meter weighs about 400 kilograms. In other words, this catalyst can occlude its own weight of sulphur. (The action of activated coal in this instance is not adsorptive but rather catalytic and has not been fully explained.)

The reaction can be accelerated by the use of small amounts of alkaline materials such as ammonia.

After the activated coal has been saturated with sulphur, the latter is removed and the coal regenerated. In order to separate sulphur in pure form, activated coal may be subjected to the action of hot gases or steam, or treated with organic or inorganic solvents. The most practical method is extraction with a solution of ammonium sulphid, which is described hereinafter in this report.

The process starts from gas from which tar and ammonia have already been eliminated. The contents of air are about from three to four per cent by volume. This gas receives an admixture of 0.3 gram of gaseous ammonia per cubic meter and is then forced through a filter of activated coal. There are two filters in use, the gas being switched to a fresh filter while the one saturated with sulphur is being regenerated and the sulphur recovered.

*Mr. Dow is the American Consul in charge at Frankfort-on-Main, Germany, and this article is a digest of a report he made to the Bureau of Foreign and Domestic Commerce, United States Department of Commerce.

### *Regeneration of Filters*

As soon as the presence of traces of sulphuretted hydrogen appears in the gas, which occurs at regular intervals, the gas is switched off and the mass of activated coal subjected to the action of 12 to 15 per cent solution of ammonium sulphid. The latter is introduced into the filter from a tank by means of a pump, in sufficient quantity to cover the coal. After a brief space of time, sulphur goes into solution and the liquid, which now becomes a polysulphid, is pumped off to its tank. The operation is repeated with three other tanks containing sulphid solutions of increasing purity until the final flushing removes the last traces of sulphur from the activated coal. The latter now contains only a moisture of pure ammonium sulphid which is removed by steaming at 100° C. The exhaust steam is condensed and the recovered ammonium sulphid fed into the tank containing the pure solution (the last in the series).

### *Recovery of Sulphur*

Sulphur is recovered from the polysulphid solution by boiling, which is performed to the best advantage when sulphur contents constitute from 200 to 300 kilograms in 1,000 liters of the solution. Boiling is done in a special vessel by direct introduction of steam. The gases are led off and condensed in a cooler, whereas the sulphur gathers at the bottom of the boiler. At the end of the process, the recovered sulphur is allowed to cool off and then is stirred for a while and finally dewatered in a centrifugal machine. The resultant product is a granulated mass of pure sulphur containing about one to two per cent of moisture. The liquid remaining after separation of sulphur, is used as an absorption medium for the gases (steam, ammonia and sulphuretted hydrogen) escaping during the steaming of the filter and the boiling of the polysulphid solution.

### *Commercial Aspects*

The cost of labor involved in the above process is considerable when it is worked on a small scale. On a large scale, the human agency can be largely replaced by mechanical appliances. It is stated that at a production of 7,500,000 cu.ft. of gas per day of 24 hours, the process can compete with the other processes now commonly employed, and when production is very large, the value of the sulphur recovered will pay all the expenses of operating the process.

The activated coal process is also in use at the synthetic fertilizer plants at Oppau and Merseburg, where it is applied to purification of water gas (furnishing hydrogen for synthesis of ammonia). The volume of water gas produced in these works is said to be 5 million cubic meters, or about 175 million cu.ft. per 24 hours. From this amount of gas about 15 tons of sulphur are recovered every day.

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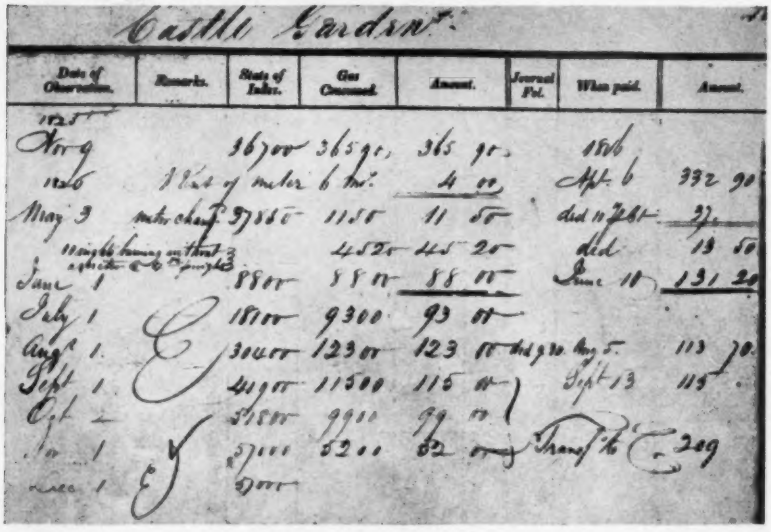
## Pioneer Gas Lighting Expert Is Dead

John Pond, editor since 1922 of The Summerside Pioneer, and inventor of the "penny-in-the-slot" gas meter, died recently in Charlottetown, Prince Edward Isle., at the age of sixty-eight years. A native of Surrey, England, Mr. Pond was a civil engineer and lighting expert before engaging in newspaper work.

He patented many gas lighting devices and some of London's streets are still illuminated by means of his apparatus. In recognition of his services to the City of London he was honored with the freedom of the city by Lord Mayor Sir Joseph Dinisdale in 1902.

# Century-Old Gas Bill



Castle Garden

| Date of Observation. | Remarks. | State of Inlet. | Gas Consumed. | Amount. | Journal Fol. | When paid. | Amount. |
|---|---|---|---|---|---|---|---|
| 1825 | | | | | | | |
| Nov 9 | | 36700 | 36500 | 365 00 | | 1826 | |
| 1826 | 1 Year of meter 6 mo: | | | 4 00 | | Apl 6 | 332 90 |
| May 3 | meter chang[illegible] | 37880 | 1150 | 11 50 | | did [illegible] | [illegible] |
| | [illegible] | | 4525 | 45 25 | | did | 13 50 |
| June 1 | | 8800 | 880 | 88 00 | | June 10 | 131 20 |
| July 1 | | 18100 | 9300 | 93 00 | | | |
| Augst 1. | | 30400 | 12300 | 123 00 | | [illegible] Aug 5. | 113 10. |
| Sept 1. | | 41900 | 11500 | 115 00 | | Sept 13 | 115 . |
| Oct 2 | | 51800 | 9900 | 99 00 | | | |
| Nov 1 | | 57000 | 5200 | 52 00 | | Transf'd to C 209 | |
| Dec 1 | | 6000 | | | | | |

THE 105-year-old ledger of the New York Gas Light Company shows that old Castle Garden in New York was lighted by gas in November, 1825. This was the year in which gas first was introduced in that city. The above picture is a photographic reproduction of a leaf from the New York Gas Light Company's ledger, now in the possession of The Consolidated Gas Company of New York.

Castle Garden's first gas bill was for 36,700 cu.ft. of gas (at the rate of $10 per 1,000 ft.) and in addition $4 was charged for six months' rental of the meter. The meter was changed in May, 1826.

## Jersey and Delaware Plants Change Ownership

ACCORDING to a joint statement issued by John E. Zimmermann, president of The United Gas Improvement Company, and Clarence H. Geist, an agreement has been entered into under which U. G. I. will acquire, through an exchange of stocks, Atlantic City Gas Company, Peoples Gas Company (N. J.) and Wilmington, Del., Gas Company. Under an arrangement with Public Service Corporation of New Jersey the Atlantic City Gas Company and Peoples Gas Company will be transferred by U. G. I. to Public Service Corporation of New Jersey, and the acquisition of these two companies and the subsequent transfer of them to Public Service Corporation of New Jersey are subject to the approval of the Board of Public Utility Commissioners of New Jersey.

Upon the consummation of the exchange, Mr. Geist will be elected a director of U. G. I.

The Atlantic City Gas Company supplies gas service to Atlantic City, Ventnor, Margate City, Longport, Absecon, Northfield, Linwood, Somers Point, Egg Harbor, Mays Landing and other communities; Peoples Gas Company supplies gas service to Glassboro, Vineland, Swedesboro, Hammonton, Woodstown, Pennsgrove and other communities, all in New Jersey. Wilmington Gas Company supplies gas service to Wilmington, New Castle, Richardson Park, Oak Grove, Ashley, Glynrich, Roselle, Forrest Park, Newark, Newport, Bellefonte, Claymont, Elsmere and several other communities in Delaware, and also supplies gas to companies furnishing gas service in Elkton, Maryland and Kennett Square, Pennsylvania and vicinity.

**Effective July 1, 1930, the telephone number of the Gas Association Headquarters at 420 Lexington Avenue, New York City, will be Lexington 425. This change will mean improved service for all incoming and outgoing calls, both local and long distance.**

## Three Are Awarded McCarter Medals

McCARTER Medals of the American Gas Association, the award for resuscitation by the prone pressure method, recently were bestowed upon three employees of gas companies, as follows:

*F. Bourne*

Frederick Bourne, of the Ridgewood Gas Distribution Department, Public Service Corporation of New Jersey, was presented a McCarter Medal April 10, for having revived by the prone pressure method a victim of gas asphyxiation. The resuscitation took place February 18.

Peter Frankle, line foreman of the Perth Amboy Electric Distribution Office, Public Service of New Jersey, who also revived a victim of gas asphyxiation.

*P. Frankle*

Elmer Humes, supervisor, of the Philadelphia Gas Works Company, who saved the life of a woman who had been overcome by gas.

*E. Humes*

Thomas M. Bennett night order man of the same company, who assisted Mr. Humes in the resuscitation, was awarded a McCarter certificate. The presentations were made at the annual rally of the company by Conrad N. Lauer, president.

## Mr. Newcomb Honored

Josiah T. Newcomb, counsel of the Joint Committee of National Utility Associations, received the degree of Doctor of Philosophy for his researches in social science, particularly economics and sociology, at the graduating exercises of George Washington University, Washington, D. C., on June 12.

# Radiant Heat From Radiant Heaters And Its Measurement

**Widespread public interest was aroused last Spring when newspapers throughout the country announced that "the family gas heater was a possible source of invisible health rays," adding "the rays sought from this type of 'stove' are the latest and least known in light treatment—infra-red beams, too long to be visible, but too short to be actual heat."**

**This news report was based on a paper read before the American Chemical Society, in session at Atlanta, Ga., by Dr. F. E. Vandaveer, supervisor of the American Gas Association Testing Laboratory, Cleveland, Ohio, and it is presented in full herewith.**

*F. E. Vandaveer*

By F. E. Vandaveer

Supervisor, A. G. A. Testing Laboratory, Cleveland, Ohio

THE value of radiant energy, emitted by the sun, for prolonging human life and improving general health conditions is becoming universally recognized. Medical science has shown that people who have been deprived of the benefits of exposure to the sun, either by reason of adverse climatic conditions or because of being confined with-in-doors, are much more susceptible to diseases of various kinds such as tuberculosis, pneumonia, neurasthenia, etc. Remarkable relief has been given to children suffering from rickets and malnutrition by giving them sun-baths, and otherwise bringing them into more direct contact with the beneficial rays of the sun. The widespread interest and beneficial results obtained through this medium is reflected by many of the more prominent hospitals and sanitariums in prescribing sun-baths and exposure to artificial ultra-violet rays in the treatment of certain diseases.

As a knowledge of its medicinal value increases, more and more attention will be directed toward duplicating and scientifically controlling this type of radiant energy by artificial means. The health-giving rays of the sun cannot penetrate fog, smoke, dust, ordinary window glass, or solid objects of such material as are generally used for constructing houses and factories. In many large cities, fog, smoke, or dust obstruct the sun's rays a great proportion of the time and this is particularly true during the winter months. At this time of the year the days are much shorter and the inclination is to remain inside as much as possible. Statistics show that during the winter months there are a great many more deaths than during the summer. In some localities the sun's rays are obstructed for four or five months during the year. Therefore, if this vital radiant energy is to be obtained, deaths decreased, and general health conditions improved, artificial radiant energy must be provided.

A very logical source of supply of such energy is from room heaters of the radiant type since the greatest necessity for artificial radiant energy comes during the winter time. Energy from gas-fired radiant heaters approaches, to some extent, that emitted by the sun and, by application of the necessary research, could probably be made to give off a greater percentage of the type of energy desired. A great deal of scientific work has already been done in England and some very interesting information published in a booklet on Radiant Heat and Comfort, by Radiation Limited. It is pointed out that while the "biologic" effect of ultra-violet rays is widely known, it is not generally realized that visible energy and the shorter infra-red rays have a definite "stimulative" value, usually attributed to the power they possess of penetrating the outer layers of the skin. A higher intensity can be borne of incident energy of the visible or short infra-red quality than of the long infra-red and this is thought to be due to the greater penetrativeness of the shorter rays. The energy emitted by the sun contains more visible and short infra-red energy than that emitted by a domestic fire, and this would appear to explain why it is possible to bear in comfort more sun energy than of the energy produced by an ordinary red-hot body. These considerations indicate a direction of possible improvement in the gas radiant heater which should tremendously increase its value for heating and health purposes.

There has been considerable research conducted along the above lines in this country but very little published scientific information is available on the subject. An interesting booklet entitled "Ultra-Violet Sun Heat in the Home" was recently published by The Ray-Glo Corporation, Athens, Ohio. It contains some new information on radiant heat. Another very interesting booklet on the subject "When Heat is Health" written by Floyd Parsons for the General Gas Light Company was also recently published. A possible field of research is mentioned in all of the above papers which, it is believed, should be encouraged and developed.

Not only are we interested in the quality of the heat emitted, but also in the quantity or the efficiency of a heater for producing radiant heat. It is proposed in this paper to give a brief review of published literature, to summarize the work done at the Testing Laboratory of the American Gas Association on measuring radiant heat and to point out how the radiant

efficiency of space heaters might be improved.

Prior to 1910 very few references are made to instruments suitable for measuring radiant energy from gas heaters. In 1910 Callendar[2] described a radiobalance, an ingenious device in which the radiometer receiver consisted of a thermojunction which could be heated electrically to neutralize the heat generated in the receiver by absorbing radiant energy. W. W. Coblentz of the U. S. Bureau of Standards wrote several valuable papers[3, 4, 5, 6] in 1914 to 1916, describing his work on determining radiant energy. The thermopile used by the American Gas Association Testing Laboratory, and described in this paper was made according to Mr. Coblentz's recommendations, based on the information contained in the papers written by him.

Bone *et al.*[1] described a bolometric method of determining the efficiencies of radiating bodies. Radiation from the source falls on two coils of platinum wire wound upon a thin piece of mica for firmness and coated for constancy to an even surface with hard black enamel, the two coils being mounted back to back on either side of a circular gun metal box provided with water circulation and suitable covers for the coils. The coils are connected to a galvanometer for readings. To keep constant the zero of the indicator, the temperature of the receiver must be maintained constant and therein lies one difficulty in its general use.

In 1923 Moll[13] published an account of a thermopile for measuring radiation. The cold junctions of the thermopile were in contact with metal masses which kept down their temperature. In order that the hot junctions may have small heat capacity the bimetallic strips composing the thermopile were made of plates of constantan and manganin silver soldered along an edge rolled in a direction parallel to the edge into thin foil and then cut into strips perpendicular to the edge. This thermopile is similar in many respects to the instrument being used at the A. G. A. Testing Laboratory.

Another instrument called radio thermometer[9] has been used for measuring radiant heat by noting the temperature rise of a weighed amount of water in a copper box which is situated at a distance of about three feet from the heater. The box is insulated on all sides except that facing the heater, this side being blackened to increase the absorption effect. This method is open to two objections: First, the heat absorbed may be affected by air currents passing over the rough blackened surface of the box; second, the time required for measurement of temperature rise of suitable magnitude is about one hour. The intensity of radiation through the space in front of the heater varies widely at different points, so that a great many measurements must be made.

Reihr and Knoblauch[16] studied radiation from domestic room heaters by means of a bolometer and apparently obtained good results.

Radiation Limited[10] of London gives a general view of apparatus (unscreened) used in measuring the penetrancy of radiant energy. The apparatus consists of a specimen holder, spectrometer, lamp and holder, and galvanometer.

In 1926, when research for Approval Requirement Committees of the American Gas Association was being conducted preparatory to writing requirements for radiant heaters, it became necessary to devise an apparatus which would measure radiant efficiency with comparative accuracy and at the same time be rapid enough to be used in routine testing work. After trying some of the methods in use at that time W. W. Coblentz of the U. S. Bureau of Standards was consulted and as a result the thermopile described by Shawn[18] and discussed in detail herein was developed. Since that time approximately six hundred heaters have been tested for radiant efficiency and the results obtained have been consistent and comparatively accurate as will be shown later.

### *Description of Thermopile and Support*

The thermopile used for determination of radiant heat from gas-fired radiant heaters is shown in Fig. 1. It consists of a cylindrical brass box A, two and one-half inches in diameter by two inches in depth painted on the outside with white enamel and on the inside with black enamel. A brass shield B also coated with white enamel serves to protect the electric connections from direct heat from the heater. To regulate the area of the hot junctions exposed to the heat, enameled brass shutters C are used. The end of shutter D is recessed one quarter of an inch to prevent convected heat affecting the thermopile. Directly back of the slit, a transparent quartz disc ground and polished to 15/16″ diameter and 0.025″ thick is located. The wiring of the thermopile shown in the lower circle consists of twenty-four junctions of copper-constantan connected in series. At each junction the wires are soft soldered to a tin plate 1.56 mm square and .022 mm thick painted on the front side only, with a solution of lamp black in alcohol and then coated with the soot of a sperm candle. The copper wire I is .0015″ diameter and the constantan wire J is .003″ diameter wire rolled flat to .02 mm. The tin receivers E of the hot junctions are in thermal but not electrical contact, this being accomplished by shellacing the edges of the receivers and overlapping when assembling.

Twelve of the junctions E are arranged together directly back of the slit in the box, the other twelve junctions F, with six on each side of the hot junctions, are so placed that no radiation can reach them. Copper lead wires extend from the thermopile to the binding posts G. Approximately 3/16″ back of the thermopile is an isinglass K, fastened to the insulator L, to enclose the thermopile and further protect it from air currents. A steel rod H to which an apparatus for supporting the thermopile may be attached, extends from the back of the instrument. The instrument was designed and made by the Eppley Laboratory of Newport, Rhode Island.

In use, the thermopile is mounted on a support which slides on a ¾″ bar formed in the arc of a circle of two-foot radius. This support is shown in Fig. II. The bar is mounted in a vertical position with pivots at top and bottom so it may be swung along the arc of a circle. The holder at the top of the bar is graduated in ten degree intervals and on the bar itself there are stops for the thermopile at five degree intervals. Readings may be taken over an area equivalent to ap-

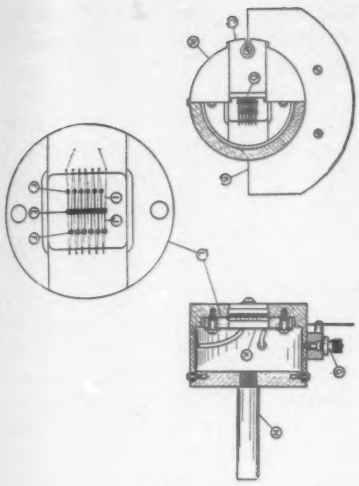


*Fig. 1*
*Drawing of thermopile for determination of radiant heat.*

proximately two-thirds of a hemisphere of two-foot radius.

### *Calibration of Thermopile*

To calibrate the thermopile it is necessary to use as a source of energy some object whose radiant energy output is known and constant. W. W. Coblentz[3] recommended that for refined measurements of radiation stimuli a standardized lamp be used for calibrating purposes. Lamps previously made for standardization purposes emitted such a small quantity of radiant energy that the calibration points were below the range of readings obtained from a radiant type of gas heater. Consequently it was necessary to prepare special lamps for this purpose. Dr. W. E. Forsythe and his staff at the Nela Park Research Laboratory of the General Electric Company, Cleveland, Ohio, consented to make and calibrate these lamps. Calibration of the lamps was accomplished by measuring the mean spherical candle power and then the horizontal candle power in the direction in which the lamps are used for standards. The spherical photometer and the horizontal photometer used in this work are shown in Figures III and IV. From the two readings obtained, corrected for gas loss and end loss the total energy per square centimeter in a definite direction was calculated. The radiant energy of these lamps was given in watts per square centimeter at a distance of twenty centimeters from the plane of the filament.

For calibrating the thermopile the standardized lamp was placed in a socket, connected to 110 volt D. C. current and the thermopile arranged so as to focus on the side of the bulb opposite the supports for the filament in a direction perpendicular to the plane of the filament directly in line with the marks on the side of the bulb and at a distance of 20 cm. To prevent reflection the table and walls were blackened. The line voltage was adjusted to 110 volts and the lamp allowed to heat thoroughly and readings as indicated in millivolts on the potentiometer recorded. Readings obtained on one each of the following lamps, 100 watt, 300 watt, 500 watt and 1000 watts, without the quartz window, are given in the above table.

TABLE I
Readings Obtained in Calibration of Thermopile.

| *Lamp Size (watts)* | *Lamp Number* | *Millivolts* | *Lamp Voltage* | *Energy at thermopile* | |
|---|---|---|---|---|---|
| | | | | *Watts per sq.cm.* | *B.t.u. per sq.ft.* |
| 100 | 86-1676 | .43 | 110 | .0129 | 41.1 |
| 300 | 86-1678 | 1.52 | 112 | .0475 | 150.2 |
| 500 | 86-1675 | 2.49 | 109 | .0797 | 252.2 |
| 1000 | 180 | 7.65 | 110 | .251 | 796.0 |

To convert watts per square centimeter to B.t.u. per sq.ft. per hr. multiply by 3170 (3.415 x 929).

Knowing the different millivolt readings and their corresponding B.t.u. per sq.ft. per hr. curve No. 1 was plotted with millivolt readings as ordinates and B.t.u. per sq.ft. per hr. as abscissa. The curve shows that as the radiant energy increases the thermopile readings in millivolts increase so that the resultant curve is practically a straight line. It also indicates that an average arithmetical figure representing B.t.u. per sq.ft. per hr. per mv. may be used. Table II shows the method of obtaining the mean value in B.t.u. per sq.ft. per hr. per millivolt.

### *Method of Test and Calculation of Results*

The A. G. A. Approval Requirements for Space Heaters (1930) in Part II, Section 13b specify that: "An appliance represented as a radiant heater shall have a radiant efficiency of not less than 25 per cent." The method now used in the Laboratory for the determination of radiant efficiency of space heaters consists of a thermopile suitably mounted to obtain a sufficient number of readings to insure an accurate measure of the total useful radiant energy emitted.

It was considered by the Laboratory after a study of the data at hand, that the effective radiant heat from a space heater was thrown out over the area determined by 130° angles in the vertical and horizontal planes normal to and through the center of the heater. It was also found that readings taken every 10° gave results which are practically the same as readings every 5° and could be made in about half the time required for the latter.

When the heater is set up for test the center of the radiants are placed exactly 2 feet away from the face of the thermopile and at the center of the sphere over which the readings are taken. The heater is lined up by setting the thermopile at the 0° position of the rail, and the rail at the 0° posi-

TABLE II
Showing Method of Calculating Mean Value in B.t.u. per sq.ft. per hr. per Millivolt.

| *Lamp Size Watts* | *MV. Reading* | *B.t.u. per sq.ft.* | *B.t.u. per sq.ft. per hr. per mv.* | *Mean Value* |
|---|---|---|---|---|
| 100 | 0.43 | 41.1 | 95.7 | |
| 300 | 1.52 | 150.2 | 98.9 | |
| 500 | 2.49 | 252.2 | 101.1 | 100.3 |
| 1000 | 7.65 | 796.0 | 105.4 | |

The mean value in B.t.u. per sq.ft. per hr. per millivolt is the figure used in computing the radiant efficiency of a radiant heater.

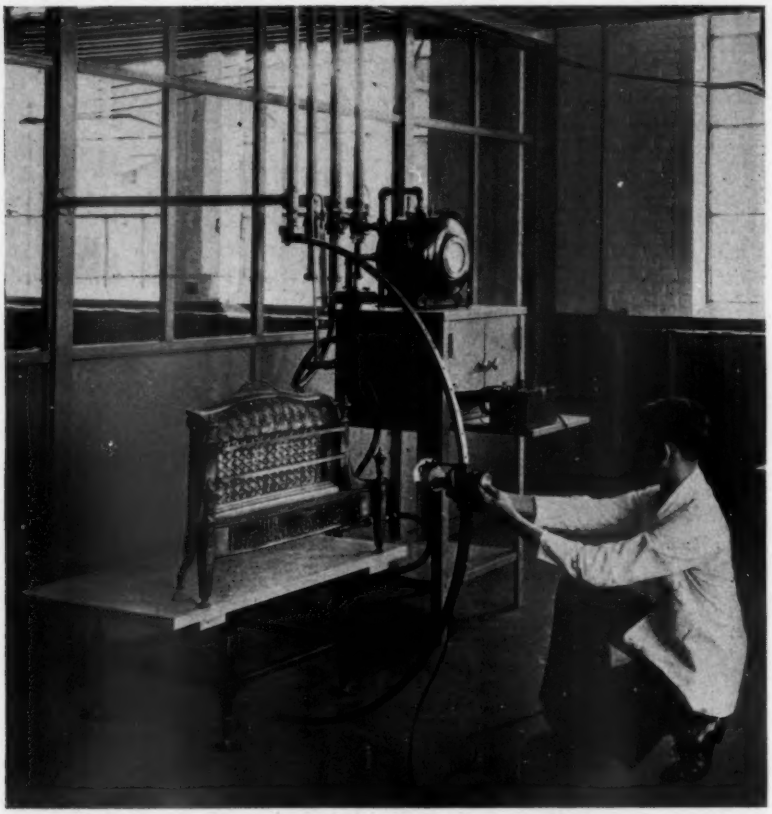


*Fig. 2*
*Showing apparatus for determination of radiant heat.*

tion on the horizontal scale. The heater is then adjusted on the table until the center of the radiant is in line with the aperture in the thermopile and 24 inches from its face. The rail is then swung through a 20° arc and a measurement made to the nearest part of the heater. The rail is then swung to the 20° position on the opposite side and a measurement taken at the same place on the opposite end of the heater to which the former measurement was made. When these two 20° measurements are the same and the center of the heater is 24 inches from the face of the thermopile, the heater is then in the proper position and ready for test.

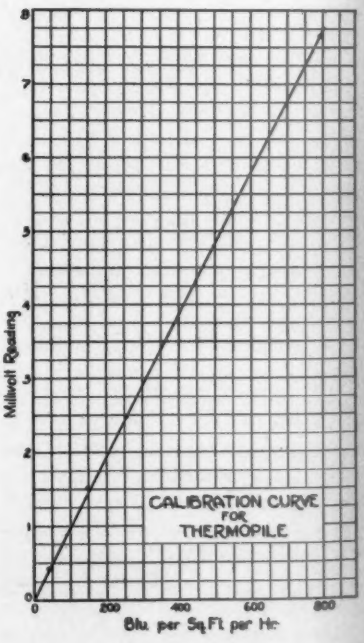
The heater, which has previously been adjusted to the manufacturer's B.t.u. rating, is then lighted, adjusted to normal pressure, and permitted to burn for one-half hour. This allows the heater to become thoroughly heated and to reach a state of thermal equilibrium. The potentiometer is balanced against its standard cell, after which the readings are taken.

The B.t.u. rate of the heater is first obtained and recorded in the proper space on the data sheet. The rail is then swung to a 60° position and clamped. The thermopile is clamped in successive 10° positions along the rail from +60° to—60° and the millivolt readings obtained for each position and recorded in their proper place on the data sheet. Care must be taken in obtaining such readings to make sure that the thermopile has remained long enough in place to give a constant reading on the potentiometer. Care must also be taken to prevent drafts from playing across the heater and thermopile.

The rail is then swung around 10° and clamped. The thermopile is moved along the rail and readings obtained as before. This process is repeated until the area over which the effective radiant heat is thrown out, is completely covered by readings at 10° intervals. This series of readings is taken with the fused quartz window in place.

*Correction for Diathermacy of Quartz*

Early in our experiments, it was discovered that the quartz glass window used in the instrument did not transmit all the radiant energy. All solid objects, however transparent, absorb some of the radiant heat which falls upon them. Those which permit radiant heat to pass through them are said to be diathermous. The diathermacy of a substance usually depends upon the nature and temperature of the source of radiant heat. Since the temperature of the radiating elements varies with different heaters, the best substance to use for covering the slit would be one, if it could be found, whose diathermacy was unaffected by this temperature variation. Among all the substances tried, a polished disc of clear rock salt came the nearest to showing the desired characteristic. However, exposure to the intense radiated heat and moisture caused the disc to lose its polish and a change in reading would occur. It was, therefore, decided to make a diathermacy correction for each heater using a quartz disc as




*Curve No. 1*

the slit covering. This is done by removing the quartz window, setting the thermopile at either the +10 or 0 position on the rail, swinging the rail to the 10° positions, and taking the millivolt readings for each position. This would give a series of readings across the face of the heater. The 10° or 0° position of the thermopile on the rail is used depending on which gave the higher readings on the previous run. The position giving the higher reading is used.

The sum of the first series of readings across the face of the heater divided by the sum of the readings with no window in the thermopile, and the thermopile in the same position as in the first series, will give a figure between 0.3 and 0.5 which is called the diathermacy constant. The readings without the quartz window in place are taken with the slit in a vertical position and due to the construction of the slit the thermopile is unaffected by convection currents.

To determine whether the ratio of the readings with the window in place to those with the window out of place was constant, readings were taken at the 0° and 10° horizontal positions on several heaters. The results on three of them are listed below and show that this figure is a constant within the accuracy of our measurements.

| | *Diathermacy Constant* | |
|---|---|---|
| | 0° | +10° |
| Heater No. 1 | 0.413 | 0.418 |
| Heater No. 2 | 0.355 | 0.349 |
| Heater No. 3 | 0.389 | 0.381 |

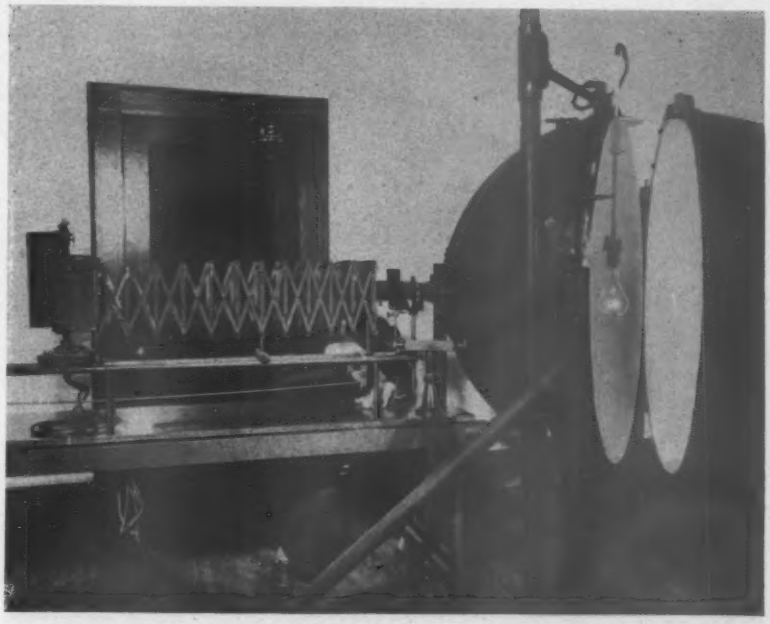


*Fig. 3*
*Spherical photometer showing lamp in place.*

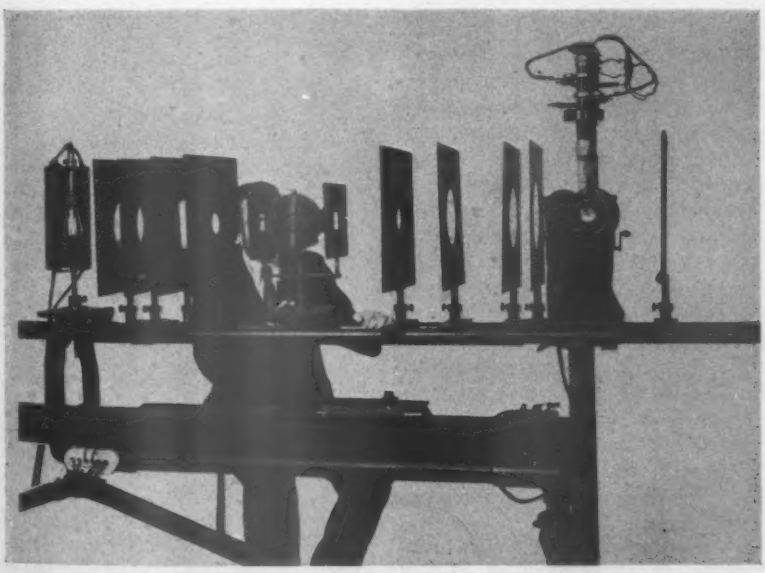


*Fig. 4*
*Horizontal photometer showing the lamp being standardized at right end.*

Each reading of the thermopile represents the radiation emitted through a certain area and since the area covered by each series of horizontal readings is smaller the farther away from the 0 position they are taken it is necessary to correct them for the area actually represented. The mathematical solution is not included here but the procedure for obtaining these factors is shown under step number two.

To calculate the radiant efficiency proceed as follows:

*First* Add all the millivolt readings across the sheet, or in other words all the readings taken in the same horizontal plane.

*Second* Multiply these results by a series of constants to obtain a weighted average for the area represented in each horizontal plane.

*Third* Add the weighted averages so calculated. This gives a weighted average of the entire series of millivolt readings.

*Fourth* Calculate the diathermacy constant. This is done by determining the ratio of the energy measured with the quartz window in place to the energy measured with no window in place.

$$\text{This value } K = \frac{\text{Sum of horizontal readings of max. value}}{\text{Sum of no window readings taken over same area}}$$

*Fifth* Calculate the radiant efficiency. Since from the thermopile calibration a value is obtained which is in B.t.u. per sq.ft. per hr. per millivolt, it is necessary to take into account the weighted millivolt value and the area covered, as well as the diathermacy constant. Taking these things into account our formula for radiant efficiency becomes:

$$R = \frac{M \times A \times K}{D \times I} \times 100,$$

Where:
M = Weighted millivolt value
A = Area covered (16.451 sq.ft.)
K = Thermopile constant (B.t.u./sq.ft./Hr./Mv. = 100.3 for the thermopile used
D = Diathermacy constant
I = Input B.t.u./Hr.
R = Radiant efficiency

Sample Calculation

*Step No. 1.* Assume the following summations of horizontal values:

| | *With quartz window* | *Without quartz window* |
|---|---|---|
| + 60° = | 18.31 | |
| + 50° = | 22.70 | |
| + 40° = | 25.80 | |
| + 30° = | 26.56 | |
| + 20° = | 26.83 | |
| + 10° = | 25.98 | 65.40 |
| 0° = | 23.28 | |
| − 10° = | 19.84 | |
| − 20° = | 14.78 | |
| − 30° = | 8.84 | |
| − 40° = | 4.09 | |
| − 50° = | 1.33 | |
| − 60° = | .55 | |

*Step No. 2.* The series of constants previously referred to are calculated as shown below:

$$\text{Factor} = \frac{h_n}{H \times Q}$$

$h_n$ = height of a given zone represented by a thermopile reading
H = total height
Q = number of horizontal readings = 13

Factor at

$$60° = \frac{.17432}{13 \times 3.6252} = 0.003698$$

$$50° = \frac{.22408}{13 \times 3.6252} = 0.004753$$

$$40° = \frac{.26706}{13 \times 3.6252} = 0.005665$$

$$30° = \frac{.30192}{13 \times 3.6252} = 0.006406$$

$$20° = \frac{.32760}{13 \times 3.6252} = 0.006951$$

$$10° = \frac{.34332}{13 \times 3.6252} = 0.007284$$

$$0° = \frac{.34864}{13 \times 3.6252} = 0.007397$$

Using the summations of step No. 1 the weighted average of each horizontal series becomes:

+60° — 18.31 × .003698 = .0676
+50° — 22.70 × .004753 = .1080
+40° — 25.80 × .005665 = .1460
+30° — 26.56 × .006406 = .1698
+20° — 26.83 × .006951 = .1869
+10° — 25.98 × .007284 = .1890
0° — 23.28 × .007397 = .1720
−10° — 19.84 × .007284 = .1443
−20° — 14.78 × .006951 = .1026
−30° — 8.84 × .006406 = .0567
−40° — 4.09 × .005665 = .0231
−50° — 1.33 × .004753 = .0063
−60° — .55 × .003698 = .0023

*Step No. 3.* Summation of values found in (2) = 1.3746

*Step No. 4.* Calculation of diathermacy constant =

$$\frac{\text{Summation at } + 10° \text{ with window}}{\text{Summation at } + 10° \text{ without window}} = \frac{25.98}{65.40} = .397$$

*Step No. 5.* Radiant efficiency =

$$\frac{1.3746 \times 100.3 \times 16.451 \times 100}{.397 \times 23{,}100} = 25.0\%$$

23,100 = B.t.u. of gas consumed during test.

## *General Discussion*

By the above procedure 169 readings are taken which permits a more correct average of the amount of heat radiated than if observations are made at only a few points. The area covered by these readings includes, we believe, all of the useful heat radiated from the appliance. Adjustment of the instrument to the varying conditions may be made rapidly and the readings taken a few seconds after the setting is made. All readings may be taken by one man in approximately three hours or by two men, one reading the potentiometer and the other changing the position of the thermopile, in approximately one and one-half hours. Accuracy of the method depends primarily on how accurate the potentiometer readings are made. The readings taken have been found to vary from zero to 4.2 millivolts, the average over the whole area tested usually being about 1.5. Since readings on the potentiometer can be made within 0.02 millivolts, an accuracy of 1.3% of the indicated value may be expected. In other words on the basis of potentiometer readings if an efficiency of 30% is obtained it is accurate to within ±.39%.

The entire apparatus and procedure are capable of giving duplicate results within this degree of accuracy as shown by the following table:

TABLE III

Showing possibility of duplicating results and reliability of method of test.

1st test.....48.2% radiant efficiency
2nd test
next day .....47.8% radiant efficiency

Average .....47.6%

Maximum variation between readings 0.4%

The above table would indicate that the efficiency result obtained is accurate well within ±1%.

That an instrument of this type measures radiant heat only has been demonstrated by Coblentz[5] and Moll[13] but whether the conditions under which the thermopile is required to operate modifies its accuracy, must be determined before it can be said that the results obtained are entirely correct. Consequently, all heat except the radiant heat from a radiant fire was determined as nearly as possible by determining the flue loss, other losses through the bottom, back, sides and top of the heater and subtracting from 100. From these determinations, it appeared that the flue loss was approximately 45 per cent and other losses through the back, sides, top and bottom were approximately 7.4 per cent. While it is not claimed that this procedure was extremely accurate it served to show that the radiant efficiency of 47.6 per cent was within a reasonable degree of being correct.

## *How to Increase Radiant Efficiency*

As a result of several years experience in testing radiant heaters it has been found that there are many ways by which radiant efficiency may be increased. The time was not available to carry each possibility through to completion so they are merely listed below.

There are possibly other means of improvement but those listed have been proven to be the most common methods whereby radiant efficiency may be increased.

1. Lengthen the tips inside of the radiants thereby obtaining more heat absorbing and radiating surface. An increase of several per cent has been accomplished in this manner.

2. Increase the insulating effect of the backwall thus permitting more heat to be thrown forward. The following data will indicate the effect of backwall construction on one series of heaters all other conditions being practically identical:

Thick clay backwall.....32.1%
Thin sectional clay backwall...31.2%
Sheet metal backwall with
one sheet of asbestos.....28.1%

3. Decrease the free air content of the flue products inside of the radiants. A heater which gave the highest radiant efficiency so far obtained at the laboratory had only approximately nine per cent free air in the flue products as sampled inside of the radiants at the top. It might be said that this heater being over-adjusted was producing a slight amount of carbon monoxide, and ordinarily such a low percentage of air could not be obtained and still maintain complete combustion.

4. Increase the opening in front of the radiants by decreasing the area of the dress guard, setting the radiants well above the hearth plate, and decreasing the amount or width of the overhanging backwall. The dress guard is often made so thick that it offers considerable obstruction to radiant heat —the dress guard absorbing the radiant heat and giving it off principally as convected heat. By decreasing the size of the dress guard it is possible to increase radiant efficiency several per cent. Instances may be cited where the hearth plate was very wide and where the radiant efficiency was increased about three per cent by setting the radiants up above the main part of the hearth plate, thus permitting a greater angle for emission of radiation toward the floor. A wide overhanging backwall prevents radiant heat from getting away from the upper part of the heater.

5. The type of clay and the porosity of the clay seem to have a marked influence on the amount of radiant heat emitted. How much difference could be obtained between a porous clay radiant and a hard non-porous radiant has not been determined as yet but it would appear that there is a marked difference in favor of the more porous radiant.

### *Possibilities of Future Research*

In the preceding discussion very little has been said about improving the quality of radiant heat. Most of it has been concerned with total radiant energy. While a reasonably high percentage of the gas burned is transformed into radiant heat in present day heaters it is believed that there is a possibility of making improvements whereby this percentage may be increased on an average of several per cent. In a recent article Kurokawa[12] claims that radiants coated with palladium, platinum, copper, iron and oxide of uranium emitted more radiant energy than those without coating. Just how much effect such coatings would have is problematical but it presents an interesting vista for research.

No attempt has been made so far as the A. G. A. Laboratory is concerned to determine the percentage of the total possible of the various rays of the spectrum such as ultra-violet, infra-red, visible, etc. which are given off by a gas radiant heater but it would seem to present a very interesting and possibly fruitful research problem. After having determined the amount of various kinds of rays present in the usual types of heaters it should be possible to suggest ways and means of increasing the percentage of the short infra-red rays which seem to be desirable from a health and comfort standpoint.

### *Summary*

The thermopile and its calibration, the method of testing radiant heaters for radiant efficiency used at the American Gas Association Testing Laboratory have been described in detail.

It has been shown that:

1. The thermopile measures radiant heat.

2. The method of test is capable of giving an accuracy within plus or minus one per cent of the true reading.

3. The diathermacy constant obtained is consistent and may be accurately obtained.

Several means of increasing the total radiant heat have been given as well as a discussion of possibilities of future research work along this line.

Acknowledgment is here gratefully expressed for the assistance of all those contributing to this paper and particularly to Messrs. Albrecht, Cook, Corsiglia and Shawn.

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## Mr. Manchester Passes Away

THE sudden death of Charles H. Manchester, President of The Providence Gas Company, at his home in Providence on June 25, was announced as the A. G. A. MONTHLY was going to press.

Mr. Manchester was born in Bristol, R. I., January 22, 1865, the son of Mr. and Mrs. John Howard Manchester. After a banking career he became affiliated with The Providence Gas Company in 1912 as treasurer, and was elected president in 1919. Besides other important executive positions, Mr. Manchester was a director of the Federal Reserve Bank of Boston.

Besides his widow, Mrs. Lois Burnham Manchester, he leaves a brother, William L. Manchester, and one son, Howard N. Manchester.

# Promoting Refrigerator Sales by Proper Service

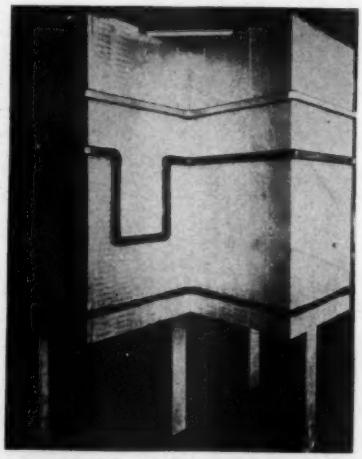
By F. E. VILAS
Acting Superintendent Refrigeration Installation and Maintenance Department, The Consolidated Gas Company of New York

*A typical apartment house installation showing refrigerator, sink and range compactly arranged.*

THAT the success of a sale of any relatively expensive article in the present day is dependent on the quality of the service provided after purchase is quite apparent. In gas refrigeration sales, the question of who connects the box and how he connects it are equally important factors in the selling program.

In New York, during 1929, 20,273 refrigerators were sold by our sales department of which the major portion were purchased as wholesale orders. These orders ranged from five, the minimum number sold on a wholesale basis, to 950 the largest order. During 1929 the refrigerators installed in new buildings were entirely connected by plumbers working according to roughing plans and detailed instructions issued by the gas company to the architects. In addition to these aids, the refrigerators were spotted by our Warehouse Department and started up and tested out by a fitter located on the job during installation. The refrigerators sold to so-called "old buildings" in which tenants were residing were connected by gas company labor to outlets in cold water lines and drains made by plumbers working as sub-contractors to the gas company.

Due to the rapidly growing popularity of the idea of automatic refrigeration in New York, a very considerable portion of our work has been of this nature. The new buildings erected in New York, with very few exceptions, are provided with automatic refrigeration. An owner frequently has told me that a new building erected in his neighborhood and thus equipped, has literally emptied his own building. For this reason the wide-awake owner or agent will make a contract with us to supply refrigerators for his entire building. He will then order boxes in small lots as his tenants move out or renew their leases, increasing the rent slightly to account for his expenditure.



*Sample of metal moulding showing three stages of installation.*

*Bottom, clips screwed to wall, tubing in place. Center, cover of moulding snapped over clips. Top, painted to match wall*

On January 1 of this year the work of installing the refrigerators was turned over in its entirety to the plumbers. It is obvious in view of the conditions mentioned above that we thus created a valuable and interested group of sales outlets.

Let us take an example. You own a building possibly ten years old, it is a "walk-up" and for some time you have been losing tenants to other newer buildings. Last year you had me, your plumber, put in new brass traps and combination tubs to brighten up the kitchen; now I, your plumber, come to you and say, "Here, Mr. Jones, your trouble is that you have not got automatic refrigeration, why not take a look at these gas refrigerators, I will put them in and you will have the gas company behind the job to guarantee good service."

Actually this has been the situation in a great number of cases. It is seldom that I interview a new plumber who is to do work for us without his referring to several old customers of his who will come forth with orders mounting into the hundreds. The modern plumber has a clientele who know and respect him, and his endorsement of an appliance that will give him a fair profit on installation, and will provide work for his men at all times, is a valuable sales asset.

At this writing we are actually employing in this work thirty-nine

*Flow meter for setting burner.*

master plumbers owning their own shops. If they were equipped to install ten boxes a day they could carry a peak load of 390 boxes per day, which might occur in the October rental season.

I imagine that by now you are asking yourselves how well is this work being done and how much is it costing. In response to this question it will be necessary to go a little deeper into the problem of installation. During the fall we were experimenting with a new method of connecting the refrigerators. As you know, the gas and water connections were made with flexible copper tubing of ⅜ inch O.D., .028 wall thickness. We found on experiment that ¼ inch O.D. copper tubing would be ample to carry the small stream of water used in the refrigerator. It was also determined that a woven coating of cotton would protect the tubing sufficiently from air currents to prevent condensation forming along the cold water lines. It was thus possible to eliminate the wire mould previously used that was both expensive and unsightly. We have now three tubes all ⅜ inch in thickness or less.

The market was then scoured for a metal sheathing to cover these tubes. The nearest available was the standard moulding used in electrical work. This, however, would only accommodate two sections of tubing. Finally it was necessary to have built special dies for a three wide moulding to accommodate these three widths. This is the installation method used at present and it has the advantages of having a presentable appearance, being practically unnoticeable when painted over. It is cheap, actually costing less per unit than the old method of installation, and best of all it forces the plumber to run his lines smooth and clean, otherwise the cover will not snap over the wall cleats.

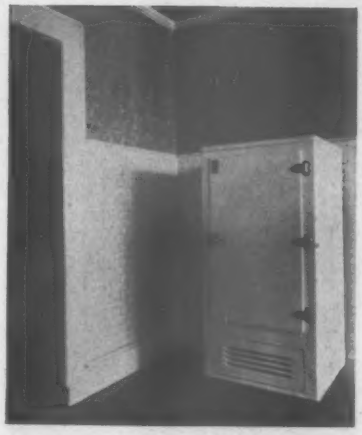
*Bending tool in actton*

Fortunately we were able to get into production on this metal moulding at the same time that we changed over to the plumbers. It was thus possible for us to break them in at the start and the question of added cost of installation for this neater type of work was not encountered. We provide every bit of material from the nipple in the trap to the refrigerator and are thus in a position to know that the work is done up to our specifications. The moulding is cut to measure from sketches exactly as pipe is handled in the shop.

*Difficult installation of metal moulding—view of water drain and gas connection*

In connection with this moulding we developed a tool for making sharp bends in the tubing so that it would fit into the moulding ells. These bends eliminate the brass ells and flare fittings formerly used at corners, thus effecting a very considerable saving.

In connection with the actual cost of plumbing installations, we have found that during the three months since January 1 the work has been done at very little more, if any, than it cost us to do it before. The retail jobs amounting to 10 per cent of our work are done by the plumbers on a cost plus basis. The wholesale jobs on "old buildings" are awarded on a basis of competitive bidding. On new building work the cost is lower, roughing can be run easily during construction so that the finish work is short. On one large job under way at present one fitter and helper install on an average of twelve a day complete.



*Difficult installation of metal moulding*

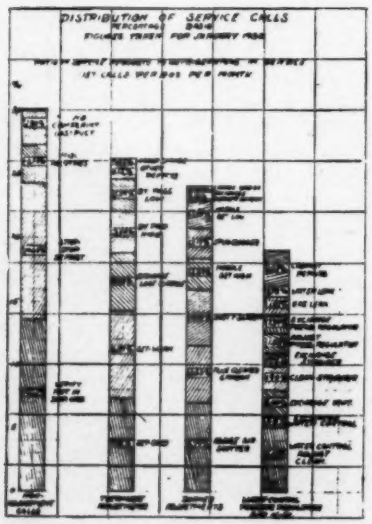
It has been necessary to provide instructors to help the plumbers get under way. Now the majority of plumbers have purchased their own bending tools and go along with only a final inspection by the gas company necessary. On every box our service commences with the call of the inspector who starts the box and instructs the party in its operation.

On summing up the question of the effect of installation on sales, I should like to point out that the most often used argument of our competitors, the electric machine, has been the complication and unsightliness of our installations. At present with the use of metal moulding we have eliminated this objection. Once installed the connections are no longer apparent. The work is done efficiently and expeditiously by the plumber, frequently already a friend of the customer. If the journeyman is slow, his boss who is watching his own purse is sure to be right after him. The uniform and good appearance

of our installations has done much to bring in the volume of orders taken at present. While many factors affect the situation, it is interesting to note that up to May 1, 1930, 7,633 refrigerators had been sold, as against 3,671 units for the corresponding period in 1929.

In order to keep a customer "sold" on any appliance adequate service is necessary. On the advent of the gas refrigerator it was felt that here at last was a machine that would be free from service. In actuality the gas refrigerator has been remarkably trouble-free. However, on 20,000 machines even a low ratio can account for some calls, and it has been our endeavor to handle these calls efficiently and bring any inherent defects to light and remedy by means of adequate analysis methods.

The weather actually plays a vital part in the service work, for with all other factors being equal, a day when the mercury climbs above 85° will bring in a goodly percentage of calls in excess of the normal. Many of these involve nothing more than the polite instruction of the customer in some of the more obvious truths, such as the fact that a refrigerator will not make ice cubes and act as a cooler for the air in the kitchen at the same time. However, a certain percentage of these calls are bona fide complaints that the box is not cold enough, and we have found the percentages of trouble are divided according to the chart. (Full scale reproductions of this chart are available). This analysis is based on figures obtained from a daily tabulation of the orders executed. This record allows immediate action where a condition appears to reach extraordinary proportions.



Such a case was the "needle valve in burner set too low" which caused some trouble last summer. To counteract this difficulty a portable flow meter was developed and is used today when a burner is adjusted. In studying the problem of service we found that a periodic inspection would effect three of our major problems, first it would provide us with a definite routine in which our men could be trained; second it would eliminate the difficulties before they grew to be complaints and third it would smooth out our rather terrific peak and off-peak labor problem. Accordingly, we inaugurated in the fall a system of inspections planned on a basis to visit all existing installations by the middle of May, 1930. We have found in following this schedule that the three desirable conditions mentioned above have been effected. Furthermore, our ratio of service requests has dropped to the low figure of 1.3 service calls per box per year. The actual cost of an inspection figured on a house-to-house basis is less than one-third that of a service request handled in the usual manner.

While the water supply in New York City is very nearly ideal, we have found that strainers in service for a year or more are in need of a cleaning. In line with this inspection work we have adapted for our use the special flow meter mentioned previously. This meter is easy to use and we have found that in our system where non-fluctuating line pressures prevail, it has been exceedingly effective in clearing up burner difficulties. In order to use the gauge it is necessary to remove the burner barrel. This barrel once removed must be cleaned and put in first-class condition before it is replaced. In using this gauge a fitting containing the second orifice is screwed on the burner base, the line pressure is noted on the U-gauge and the correct operating pressure is found on the table to correspond with the gas pressure and model of refrigerator. This pressure is obtained by adjusting the needle valve. The entire operation consumes about five minutes and we have had very little difficulty in instructing our fitters in the use of this equipment. At present every inspector and service man is equipped with this gauge. He is required to use it whenever it becomes necessary to change a burner adjustment. So far in the hot spell encountered in early May the report of "needle valve low" has been conspicuous by its absence.

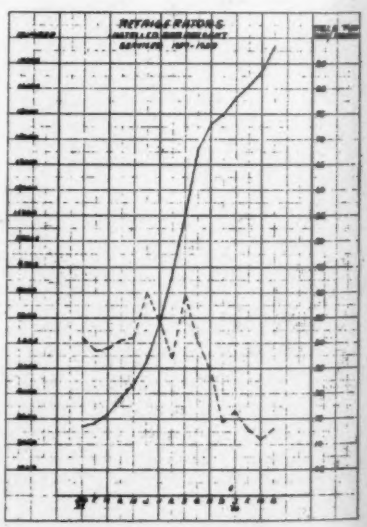
In addressing this group, not primarily interested in the technique of service, but rather in its effect, I shall not dwell further on details. However, I wish to touch on a few of what seem to me very major optimistic indications.

First, it is possible and in fact it is near to an accomplished fact, to install a gas refrigerator in the finest kitchen after occupancy by a tenant and have that installation a source of pride to the salesman and practically unnoticeable to the customer.

Second, it is possible and highly desirable for public utilities interested in sales promotion to enlist the enthusiastic support of hundreds of plumber-dealers.

Third, it is possible for a gas company to stand behind the gas refrigerator with a guarantee of free service without fear that all profits

(Continued on page 324)



# Affiliated Association Activities

## New England Gas Association

THE Thirteenth Meeting of the Operating Division of the New England Gas Association was held June 6 and 7 at the New Bedford Hotel, New Bedford, Mass. A dinner at which 108 persons were present preceded the business meeting.

General Manager Beaman, of the New Bedford Gas & Edison Light Company, extended a cordial welcome to the guests to New Bedford.

Chairman A. S. Hall, of Springfield, called the meeting to order, and some questions relative to distribution were discussed, after which the main paper of the evening was presented by L. M. Pease, superintendent of gas manufacture of the New Bedford Gas & Edison Light Company, on the "New Mechanical Generator Set." It is an 11-ft. U. G. I. set with self-clinkering generator installed for peak-load conditions. The principal points brought out were: The set has been in operation for a year with no mechanical difficulties and no apparent wear; twenty lbs. of steam per thousand ft. of gas are made in the water jacket of the generator, carbon in the ash very low, not over 10 per cent, considerable increase in capacity over hand operation; it is equipped with a mechanical charger and full automatic control; direct and indirect savings over hand clinkered set of same size figured to be .03 cents per thousand. A majority of those in attendance visited the plant Saturday morning and saw this apparatus in operation.

The ladies of the party were entertained on Friday night at bridge and Saturday morning were given a sight-seeing trip around New Bedford.

## Wisconsin Utilities Association

AN executive conference of the Wisconsin Utilities Association convention was held May 26 at the Androy Hotel, Superior, with the installation dinner, at which new officers were inducted.

The officers installed were M. H. Frank, Madison, president, succeeding G. W. Van Derzee; A. J. Goedjen, Green Bay, vice-president; Ewald Haase, Milwaukee, secretary-treasurer, and E. J. Steinberg, Milwaukee, chairman of the employers' educational section.

President Van Derzee reviewed the more important activities of the year which was supplemented by the several section chairmen. The meeting gave the complete picture of the work of the organization, and it also gave the leaders in each section a fairly good idea of what the other sections were doing.

The matters emphasized most strongly were better training of employees for public contacts, a realization that further commercial development will constantly be more difficult and will require greater effort than when the easier prospects were being secured as customers. It was also strongly emphasized that the technical and research activities must not be neglected as higher efficiency is essential to the success of our program. Constantly improved service at rates which are voluntarily reduced as often as improved efficiency and increased volume permit, coupled with courteous treatment of our customers, was voiced as the aim of our organization for the future.

*W. E. Kemen*

At the recent meeting of the Gas Section of the Wisconsin Association, W. E. Kemen, distribution engineer of the Milwaukee Gas Light Company, was elected chairman of the section for the coming year succeeding H. R. Broker, of Racine. H. B. Hummell, manager of the Wausau Gas Company was elected vice-chairman.

"Gas companies in Wisconsin will spend $7,000,000 this year for expansion and improvement of their properties and plants which serve 338,000 customers or a population of 1,500,000 people," stated H. R. Broker, chairman, in opening the annual two-day convention at Racine. One hundred and twenty-five delegates from all sections of the State were present.

*H. B. Hummell*

"House heating with gas is going to increase because people want this ideal heating service," said A. M. Marklin, of the Wisconsin Gas and Electric Company. "In 1928 there were 646 house heating customers in Wisconsin; last year, 848 or an increase of 31 per cent. The increase in consumption of gas for house heating last year was 59 per cent."

F. M. Millington, Wisconsin Public Service Corporation, chairman of the Industrial Gas and House Heating Committee, presented an analysis showing how in several cases a three-part gas rate could be developed for promoting long-hour use such as water heating.

The new nitriding process for hardening steel so the surface will not tarnish was described by G. Kurtz, Milwaukee Gas Light Co. The process includes holding the steel at high temperature for 20 to 90 hours and subjecting it to an ammonia bath.

## Southern Gas Association

THE Southern Gas Association convention and the Southern Regional Gas Sales Conference held in Savannah, Ga., June 10 and 13 met with great success. The association announced that it will meet in annual session again next June at Chattanooga, accepting the invitation extended by A. J. Goss, of the Chattanooga Gas Company.

Mr. Goss was unanimously elected president; E. W. Avegno of New Orleans, La., first vice-president; J. J. Brennan of Memphis, Tenn., second vice-president, and G. H. Schlatter of Birmingham, Ala., was re-elected secretary and treasurer. New directors elected were: R. C. Hoffman, Jr., of Atlanta; R. E. Chew of Birmingham; E. S. Dickey of Baltimore, Md.; and Edgar G. Hill of Birmingham.

Harold Meade was elected by the newly formed Industrial Section as chairman and reported that the committee would immediately take steps to study the conditions and the best methods of improving the utilization of gas.

Major Alexander Forward, managing director of the American Gas Association, told of the work being done at the Testing Laboratory maintained by the A. G. A. in Cleveland. He stressed the fact that the South had become the outstanding section of the country in promotion of sales in the gas industry.

Following adjournment of the meeting of the Southern Gas Association the Southern Regional Gas Sales Conference convened and nationally known representatives of the American Gas Association, which sponsors the conference, addressed the members.

Some of the outstanding addresses were: "The Future of Refrigeration by Gas," R. R. Guenther, Electrolux Sales, Inc., Evansville, Ind.; "Relative Value of Various Advertising Media," M. M. Scott, Ruud Manufacturing Company, Pittsburgh, Pa.; "Co-operative Regional Advertising," R. C. Hoffman, Jr., Southern Cities Public Service Co., Atlanta, Ga.; "Increasing Gas Sales per Customer," S. L. Drumm, New Orleans Public Service Inc., New Orleans, La.

Miss Jessie McQueen, home service Counsellor of the A. G. A. Staff, read a paper on "Home Service as a Gas Sales Aid."

The general conference, according to officials, was the finest meeting held in the history of the association, reports indicating that more progress had been made during the past three years in the promotion of the gas industry than had been realized during any past ten years previously. The entire spirit of the convention was optimistic and enthusiastic and the plan of having the sales conference held in conjunction with the general convention proved very helpful to both associations.

# Convention Calendar

**Michigan Gas Association,**
**Grand Hotel, Mackinac Island, Mich.**
**June 30, July 1, and 2.**

**Home Service Summer Course, Columbia University,**
**New York, N. Y.**
**July 7-25.**

**Wisconsin Utilities Association, Commercial Section,**
**Greenbay, Wis.**
**July 31 and Aug. 1.**

**Pacific Coast Gas Association,**
**Hotel Huntington, Pasadena, Calif.**
**Sept. 9-12.**

**Empire State Gas & Electric Association,**
**Saranac Inn, N. Y.**
**Sept. 18 and 19.**

**Indiana Gas Association,**
**French Lick, Ind.**
**Sept. 23-24.**

**Illuminating Engineering Society,**
**John Marshall Hotel, Richmond, Va.**
**Oct. 7-10.**

**American Gas Association, Municipal Auditorium, Atlantic City, N. J., October 13-17, Alexander Forward, 420 Lexington Avenue, New York, N. Y., Managing Director.**

**New England Gas Association,**
**Hotel Statler, Boston, Mass.**
**Feb. 3, 4, and 5, 1931.**

## Empire State Gas and Electric Association

ONE hundred and thirty accounting executives, statisticians and other office employees attended the two-day session of the Accounting Section of the Empire State Gas and Electric Association at Briarcliff Lodge, New York, on April 24 and 25.

Morris Tracy, of the Empire Gas & Electric Company, Geneva, chairman of the section, presided on the first day, with J. R. Malone of the New York & Queens Electric Light & Power Co., vice-chairman, presiding on the second.

*J. R. Malone*

At the close of the second day's session, new officers were elected, with J. R. Malone, of the New York & Queens Electric Light & Power Co., as the new chairman and F. J. Brett, of the Buffalo, Niagara & Eastern Power Corp., as vice-chairman.

The program included an address of welcome by E. H. Rosenquest, president of the Westchester Lighting Co.; papers on "Mechanical Operation of Accounts Payable," by G. E. Eble of the Consolidated Gas Co. of New York; "Accountant's Important Position in Furnishing Records of Accident Costs," by H. H. Judson, of the New York Edison Co.; "The Public Service Commission and the Accounting Practices of Public Utility Corporations," by Randall J. LeBoeuf, Jr., Niagara Hudson Power Corp.; "Cost of Installment Selling," by Ernest Johnston of the Syracuse Lighting Co.; "The Accountant's Contribution to Merchandising," by H. C. Davidson, of The Consolidated Gas Company of New York; "The Customer as an Individual," by Miss Ethel A. Conklin, of The Consolidated Gas Company of New York; "Collection Methods and Their Effect on Public Relations" by Messrs. A. R. Keller, Syracuse Lighting Company; J. Gordon Ross, Rochester Gas & Electric Corp. and M. E. Brown of The Brooklyn Union Gas Company.

An address on "The Accountant and the Public" was given by W. J. Welsh, president of the association, with others by Clifford E. Paige, vice-president of the American Gas Association, and by H. M. Brundage, vice-president of The Consolidated Gas Company of New York. J. J. Ward, of the Associated Gas & Electric System, reported as chairman of a committee on taxation records.

## Air-Conditioning for Domestic Usage

A SCIENTIFIC system of "weather-making," with gas as the fuel and an electrically-driven fan, will soon be a requirement of every well-equipped home, is the prophecy of Miss Margaret Ingels, of East Orange, N. J., who has just been engaged by the Carrier-Lyle Corporation, of Newark, N. J., to direct its educational program on proper atmospheric conditions in the home.

The first of her sex to receive recognition as in air-conditioning engineer and one of the very few women who hold a university degree in mechanical engineering, she received her M. E. at the University of Kentucky.

Air-conditioning has hitherto been applied in large buildings such as department stores, theaters, the Capitol at Washington. Now it has been adapted for domestic usage. Health authorities recognize that comfort and health depend not only on the temperature of the air indoors, she points out, but equally on its humidity, circulation and purity, and these can only be assured by scientific regulation. At present the average home is kept too warm in winter with a dry heat which increases susceptibility to disease, she says.

In adapting the principles of healthful air-conditioning to the private residence, gas was selected by Carrier as the ideal fuel, and Miss Ingels stresses that it is the only available fuel which can be burned so that practically all the heating value is utilized. Other advantages which she emphasizes as especially desirable to the modern efficient home keeper are that it gives instant heat, does away with dust, soot and smoke, and, particularly important, is under constant control.

To promote more general understanding of air-conditioning as an important health factor, Miss Ingels plans an educational program among the women of America, and will appear before leading women's clubs throughout the country.

Miss Ingels' past experience includes work in the traffic engineering department of the Chicago Telephone Company, two years in the engineering department of the Carrier Engineering Corporation, two years with the New York Commission on Ventilation, and six years in the Pittsburgh research laboratories of the American Society of Heating and Ventilating Engineers at the United States Bureau of Mines. She is a member of the society and was secretary of the Pittsburgh Chapter in 1925-27.

## Goes to Columbus

Floyd B. Hobart, a former associate of Dr. S. W. Parr, University of Illinois, and research assistant in chemical engineering, has been appointed fuel chemist of Battelle Memorial Institute, Columbus, Ohio.

**Testing Laboratory**
R. M. CONNER, Director
MANAGING COMMITTEE
R. W. GALLAGHER, Chairman N. T. SELLMAN, Secretary

# Rapid Expansion in Size of Laboratory Staff

*Laboratory Staff. Since this picture was taken, eleven have been added to the staff, making a total of forty-seven.*

DURING the Joint Production and Chemical Conference, recently held in Cleveland, a great many of the men in attendance who visited the Laboratory expressed their surprise at the size of the organization and the scope and variety of its activities. Especially during the past two years, since the erection of the new building, there has been a pronounced increase in the size of the Laboratory staff, the number of appliances tested, the inspections made at factories of appliance manufacturers and the research carried on for the American Gas Association.

In addition to its functions in connection with the American Gas Association, the Laboratory also acts as the official testing agency of the Canadian Gas Association. Several cities have written ordinances limiting the sale or installation of gas appliances to those which have been tested and approved in accordance with recognized basic American standards. Compliance with the Approval Requirements of the American Gas Association as evidenced by the approval of the Testing Laboratory is considered as complying with such ordinances.

The personnel of the Laboratory consists of approximately forty-seven men and women. All of the testing and research engineers and chemists are graduates of recognized universities. They have had training in different fields, such as chemistry, physics, chemical, mechanical, electrical and civil engineering, which makes the Laboratory capable of investigating any question which may be submitted by the gas industry.

The following types of appliances are now being tested by the Laboratory for A. G. A. approval: Flexible gas tubing, ranges, space heaters, water heaters, boilers, furnaces, hot plates, laundry stoves, clothes dryers and incinerators. Approval requirements are being written for other gas-burning appliances, such as ironers, pressing machines, conversion burners and unit heaters. It is the intention of the as-

sociation to write approval requirements for all domestic gas-burning equipment as rapidly as they can be prepared.

A rigid inspection is made at least once a year at the factory of the manufacturer to observe the manufacture and production of approved appliances. Each year our inspectors travel many thousands of miles and visit several hundred factories where approved appliances are manufactured.

Possibly the section in the Laboratory which has had the most remarkable growth in the past two years is that of research. This year, approximately $85,000 will be spent at the Laboratory in conducting various research problems. There are eight of these problems under way at the present time, as follows:

1. Research in the elimination of noise in industrial gas burners.
2. A study of the characteristics of burning gas with preheated air.
3. Special investigation to prepare approval requirements for appliances to be operated on bottled gases, such as propane and butane.
4. Research in connection with revising and improving all of the present approval requirements.
5. An investigation of the possibility of methanating manufactured gas and supplying oxygen with it in the gas mains to eliminate primary air.
6. Research on methods of making and repairing pipe joints.
7. Research for the American Cast-Iron Pipe Association on special mechanical pipe joints.
8. Mixed gas research for determining the possibility of enriching the city gas supply with propane and butane.

The Testing Laboratory has now grown beyond the stage of a small testing establishment. It is estimated that its operating expenses this year will be approximately $175,000. It is entirely self-supporting so far as the testing and inspection sections are concerned, and for any research carried on, funds are appropriated by the American Gas Association, and such activities must also be self-supporting. The prospects for its continued growth both in appliance testing and research are very encouraging. Many manufacturers have expressed their satisfaction with the performance of their appliances after having received A. G. A. approval. Each month several additional manufacturers send in appliances for their first approval test, and this is further evidence of the increasing value of the Laboratory to the appliance industry.

The success of the Laboratory has been made possible by the cooperation and assistance of gas companies, manufacturers, committees, associated governmental agencies and trade associations.

**Henceforward it is planned to devote this section of The A. G. A. MONTHLY to information regarding activities at the A. G. A. Testing Laboratory, at Cleveland, and every effort will be made to publish news items of interest to both manufacturers of gas appliances and gas companies. From time-to-time semi-technical articles will appear. Suggestions from members in connection with this feature will be appreciated.**

TO PROMOTE AND DEVELOP
THE GAS INDUSTRY TO THE END
THAT IT MAY SERVE TO THE FULL-
EST POSSIBLE EXTENT THE BEST
INTERESTS OF THE PUBLIC
THIS BUILDING IS DEDICATED
AMERICAN GAS ASSOCIATION INC.

**The purpose of those instrumental in establishing the Laboratory is well expressed in the above reproduction of the bronze tablet which was unveiled at the dedication ceremonies of the new building at Cleveland.**

## Collecting Gas Bill from City Councilman

W. J. McCORKINDALE, general manager of the Roanoke Gas-Light Company, Roanoke, Va., moved members of the Rotary Club at Hickory, N. C., to mirth in the course of an address he made the latter part of last month.

After discussing the serious side of the gas industry, Mr. McCorkindale related the following story:

"While we have in the utility business many serious problems, we also have some real funny experiences, Years ago I was sent to a city to straighten out a gas company's finances and I found many so-called uncollectable accounts. One of the accounts was against a lawyer who happened also to be a city councilman. I called on him at his office and got a very chilly reception. I had the statement of his account in my hand and while I discussed the weather, the temperatures outside and in, just to kill time, he finally got exasperated and asked what I had in my hand.

"I told him it was a statement of his account due the gas company. He seemed nonplussed at my quick and frank reply and said that he never expected to pay it. He finally almost asked me to consider the interview at an end. I then asked him his reasons for not feeling that he owed the account.

"He blurted out that he had been told that the reason that his bills were so high was because some days we made that "damned water gas."

"I asked him about his knowledge of gas and the difference between coal and water gas and like most citizens he did not know how or why either was made.

"I then drew up a chair to his table reached over and took a sheet of paper and in two rough skeletons showed him how each kind was made and why one was called water gas.

"When he found out that in the so-called water gas we had to use coke, oil and steam and why it was called water gas, how it had to be scrubbed, condensed and purified and that it really cost us more to make the water gas than our coal gas, he was convinced and finally thanked me for my trouble and paid the bill. I cite this little incident to show that a utility should take the public into its confidence and not only lay their business cards on the table, but tell and show the public some of the processes so as to give them some insight into our problems."

## Manufacturers Section

F. G. CURFMAN, Chairman C. W. BERGHORN, Secretary E. S. DICKEY, Vice-Chairman

# List of Exhibitors Grows

ON June 10 the Exhibition Committee had allotted space to more than 225 manufacturers who will exhibit at the Twelfth Annual Convention of the American Gas Association, which will take place in the Auditorium at Atlantic City, October 13-17. Among those below are represented the leading manufacturers of all kinds of gas appliances, accessories, equipment, apparatus, and office devices:

The revised list of exhibitors follows:

Abendroth Brothers....425
A-B Stove Co....608
Adams Bros. Mfg. Co., Inc....134
Addressograph Co....724; 800
Air Reduction Sales Co....834
Alpha-Lux Co., Inc....617
Aluminate Co., Inc....312
American Cast Iron Pipe Co....109
American Foundry & Furnace Co....823
American Gas Furnace Co. 144, 5; 218, 19
American Gas Journal....311
American Gas Products Corp....525, 6
American Heater Corp....247
American Meter Co...327, 8, 9; 403, 4, 5
Griffin & Co., John J.
Helme & McIlhenny
Maryland Meter Works
McDonald & Co., D.
Metric Metal Works
Tufts Meter Works, Nathaniel
American Radiator Co....525, 6
American Rolling Mill Co....245
American Stove Co....506, 7, 8, 9, 10
Clark & Co. Div., Geo. M.
Dangler Stove Co. Div.
Direct Action Stove Co. Div.
New Process Stove Co. Div.
Quick Meal Stove Co. Div.
Reliable Stove Co. Div.
Andes Range & Furnace Co....115
Autogas Corp....149
Automatic Gas Steam Radiator Co...140
Baltimore Copper Mills....146
Bailey Meter Co....227
Baltimore Copper Mills....146
Barber-Greene Co....5
Bartlett Hayward Co....517
Bartlett & Snow Co., C. O....126
Bauer & Black....108
Beckwith Co....424
Bernitz Furnace Appliance Co....229
Bingham & Taylor Corp....200
B-Line Boiler Co....240, 41
Blodgett Co., G. S....607
Bowser Service Corp....223
Bristol Co....807
Bryan Steam Corp....514
Bryant Heater & Mfg. Co....413, 14
Bullard-Davis, Inc....11
Burroughs Adding Machine Co.
....23, 24, 25, 29, 30, 31
Buxton & Skinner Printing & Stationery Co....830
Carrier-Lyle Corp....629, 713
Chambers Mfg. Co....624, 5
Chaplin-Fulton Mfg. Co....203, 4
Chicago Bridge & Iron Works....202
Claus Mfg. Co....527
Cleveland Gas Burner & Appliance Co....237
Cleveland Gas Meter Co....704
Cleveland Heater Co....411
Cleveland Trencher Co....324, 25
Clow & Sons, James B....314
Columbia Burner Co....142, 3
Columbus Heating & Ventilating Co....214, 15
Connelly Iron Sponge & Governor Co....201
Connersville Blower Co....604
Consumers Construction Co....10
Continental Stove Corp....243, 44
Coxhead Corp., R. C....824
Crane Co....728, 29; 804, 5; 832, 833
Cribben & Sexton Co....632, 3, 4, 5
Crown Stove Works....119
Cruse-Kemper Co....705
Cutler-Hammer, Inc....801, 2, 3
Dearborn Chemical Co....520
Detroit-Michigan Stove Co.
Garland Div....611, 12, 13
Jewel Div....609, 10
Dick Co., A. B....826, 27
Dresser Mfg. Co., S. R....701, 2, 3
Dun-Rite Clock Device Co....310
Duo-Tor Mfg. Co....211
Economy Governor Co....622
Electric Indicator Corp....400
Electrolux Refrigerator Sales, Inc.
....530, 31; 614, 15
Elliott Addressing Machine Co...828, 29
Ensign-Reynolds, Inc....606
Eriez Stove & Mfg. Co....710, 711
Estate Stove Co....427, 28; 511
Felt & Tarrant....825
Fisher Governor Co., Inc....620
Floyd-Wells Co....808
Fox Furnace Co....815
Foxboro Co., Inc....205, 6
Frigidaire Corp....837, 8, 9
Fuller & Warren Co....220, 1, 2
Gas & Electric Heater Co....723
Gas Machinery Co....402
Gas Purifying Materials Co....621
General Ceramics Co....118
General Coal Co....133
General Gas Light Co...732, 3, 4, 5, 6, 7
Gestetner-Duplicator Corp....26; 32
Giant Mfg. Co....132
Glenwood Range Co....512, 13
Groble Gas Regulator Co....731
Guardian Gas Appliance Co....234, 5, 6
Harper-Wyman Mfg. Co....627
Heating & Ventilating....141
Hill, Hubbell & Co....300
Hoffman Heater Co....321, 2, 3
Homestead Heater Co....111
Hones, Inc., Charles A....114
Hotstream Heater Co....232
Humphrey Co....333
Hurley Machine Co....242
Improved Equipment-Russell Engineering Corp....15
Independent Stove Co....125
Inertol Co....12
International Business Machines 616; 700
Isbell-Porter Co....706
J. & G. Brass Co....720
Johns-Manville, Inc....630, 31
Johnson Gas Appliance Co....722
Judelson Dryer Corp....238, 39
Kelly, Inc., John G....316
Kernit Incinerator Co....308, 9
Kompak Co....836
Koppers Co....518
Lambert Meter Co....228
Lamneck Co., W. E....628
Lattimer Stevens Co....207
Lavino & Co., E. J....601
Linde Air Products Co....730
Lindemann & Hoverson Co., A. J. 715, 16
Littleford Bros....102
Lovekin Water Heater Co....639
Maehler Co., Paul....717, 18
Majestic Mfg. Co....117
McEverlast, Inc....100, 101
McWane Cast Iron Pipe Co....603
Mears-Kane-Ofeldt, Inc....415
Merco Nordstrom Valve Co....835
Milwaukee Gas Specialty Co....527
Minneapolis-Honeywell Regulator Co.
....429, 30
Minwool Insulating Co....135
Mohawk Asphalt Heater Co....623
Moore Brothers Co....315
Mueller Co....401
Mueller Furnace Co., L. J....738, 39, 40
Mulcare Engineering Co....707
National Equipment Corp....1
National Lead Co....727
National Tube Co....303, 4, 5, 6, 7
Natural Gas Magazine....6
Naylor Pipe Co....9
1900 Corp....116
Ohio Foundry & Mfg. Co....210
Partlow Corp....339
Patrol Valve Co....412
Peerless Heater Co....139
Peerless Mfg. Co....741, 42
Peninsular Stove Co....714
Pennsylvania Furnace & Iron Co. 216, 17
Perco-Steril Machine Corp....246
Permutit Co....419
Philfuels Co....416, 17
Pittsburgh Coal Co....103
Pittsburgh-Des Moines Steel Co....726
Pittsburgh Equitable Meter Co.
....225, 26; 301, 2
Pittsburg Water Heater Co...522, 23, 24
Porcelain Enamel & Mfg. Co....233

Public Service Electric & Gas Co.....20
Public Utilities Reports.....131
Ray-Glo Corp.....136
Remington Rand, Inc.....21, 22; 27, 28
Reynolds Gas Regulator Co.....504, 5
Richmond Radiator Co.....712
Robbins Publishing Co.....500
Roberts & Mander Stove Co.....422, 23
Roberts Brass Mfg. Co.....334
Roberts-Gordon Appliance Corp...208, 9
Robertshaw Thermostat Co.....708, 9
Roots Co., P. H. & F. M.....604
Roper Corp., Geo. D.....431; 515
Rudy Furnace Co.....637, 38
Ruud Manufacturing Co.....406, 7, 8
Safety Gas Lighter Co.....813
Safety Gas Main Stopper Co.....110
Sands Mfg. Co.....426
Savory, Inc.....137, 38
Selas Co.....747
Semet-Solvay Engineering Corp.....326
Sherwin-Williams Co.....127
Slattery & Bro., J. B.....746
Smith Mfg. Co., A. P.....230
Spencer Thermostat Co.....212, 13
Sprague Meter Co.....420
Stacey Bros. Gas Construction Co....605
Stacey Mfg. Co.....602
Standard Gas Equipment Corp.
.....335, 6, 7, 8
Stat-Amatic Instrument & Appliance Co. .....636
Sturtevant Co., B. F.....13
Superior Meter Co.....231
Superior Screw & Bolt Mfg. Co.....719
Surface Combustion Co....317, 18, 19, 20
Sweet & Doyle Foundry & Machine Co.
.....841, 42
Tappan Stove Co.....330, 31, 32
Time-O-Stat Controls Co.....528, 29
Underwood-Elliott Fisher Co...516; 600
United Engineers & Constructors, Inc.
.....502, 3
United States Pipe & Foundry Co.....501
Universal Sand Equipment Co.....418
Victaulic Company of America..618, 19
Wailes Dove-Hermiston Corp.....521
Walker & Pratt Mfg. Co.....410
Warm Air Furnace Fan Co.....743
Watts Regulator Co.....315
Welsbach Co.....112
Western Gas Construction Co.....519
West Gas Improvement Co.....14
Wilcolator Company.....409
Wood & Co., R. D.....421
Youngstown Pressed Steel Co.....626
Youngstown Sheet & Tube Co...129, 130

# Applications For Munroe Award Are Being Received

APPLICATIONS for the Charles A. Munroe Award, which is a national recognition for outstanding achievement in the gas industry, now are being received at American Gas Association headquarters, 420 Lexington Avenue, New York City. The award will be made to the individual who is found to have made the outstanding contribution toward the advancement of the gas industry during the period from July 1, 1929, to June 30, 1930.

Under the terms governing this award, the most outstanding contribution to the general interests of the gas industry may be presumed to include the following: Research, invention, operating and transmission methods or practices which reduce cost of production, transmission and distribution, improved distribution or other service, increased sale of gas, development of new uses for gas, improved public and employee relations, promotion of safety, development of improved accounting practices, widening the field of gas making materials, new methods of manufacture, finance, publicity, new gas works products and by-products, rates, etc.

The Charles A. Munroe Award consists of a substantial financial recognition accompanied by an engrossed certificate to be presented at the annual convention to be held in Atlantic City, N. J., October 13-17, 1930. Applications should be filed with Alexander Forward, Managing Director, American Gas Association, 420 Lexington Avenue, New York City, promptly and not later than August 15.

All applications will be considered by a committee consisting of Arthur Hewitt, chairman, of Toronto, Canada; F. C. Freeman, of Providence, R. I., and N. C. McGowen, of Shreveport, La. The recommendations of this committee will be submitted to the Executive Board for approval.

The first Charles A. Munroe Award was presented to N. T. Sellman of The Consolidated Gas Company of New York at the 1929 convention of the American Gas Association in recognition of his outstanding work in connection with the development and marketing of the gas refrigerator. In the words of the committee "he kept his courage and optimism through the very trying periods when many had about concluded that the gas refrigerator was impractical." It was by this award that the gas industry recognized Mr. Sellman's contribution which proved that gas may be applied in altogether new and profitable fields.

It is believed certain there are individuals who have contributed something during the year July 1, 1929, to June 30, 1930, which is worthy of the recognition of this award. The Association Headquarters invites the cooperation of all in the industry to locate these individuals.

## Planning to Spend $3,000,000 to Distribute Liquid Gas

Distribution of liquefied natural gas in at least fifty-seven cities and towns in thirty California counties scattered from the Mexican border to the Oregon line looms as an immediate possibility, announces Claude C. Brown, state gas administrator attached to the California Railroad Commission The *Petroleum Press* quoting.

Mr. Brown revealed that applications to serve this number of communities have been filed with the commission by three public utility firms—the Natural Gas Corporation of California, West Coast Gas and Fuel Company and the Inland Empire Gas Company. The latter was the last to file, applying to the commission for a certificate of public convenience and necessity to supply the liquefied gas to Calipatria and Niland in Imperial County.

Should the commission approve the separate projects, the three companies now in the field will expend approximately $3,000,000 in installing plants and distributing systems in the following counties:

Del Norte, Colusa, Fresno, Glenn, Amador, Humboldt, Kern, Imperial, Lassen, Napa, Placer, Shasta, Sacramento, Riverside, Siskiyou, Solano, Sonoma, Tehama, Yolo, Yuma, Modoc, Plumas, Calaveras, Tuolumne, Monterey, Inyo, Sierra, Lake, El Dorado and Mendocino.

Each plant will range in cost from about $30,000 for a community of 1,000 population to $77,000 for a city of 2,500 persons.

## Commercial Section

G. E. WHITWELL, Chairman — J. W. WEST, Jr., Secretary — E. R. ACKER, Vice-Chairman

# New York Regional Sales Conference

By J. W. WEST, JR.
Secretary, Commercial Section, American Gas Association

WITH the largest attendance of any New York Regional Conference yet held, the seventh annual New York Regional Sales Conference at Lake Mohonk Mountain House on June 5-7 set a new standard for informative papers and helpful discussions of sales activities in the metropolitan area.

A. J. Peters, general sales manager of The Consolidated Gas Company of New York, presided at the meetings as chairman of the council. In opening the conference on Thursday evening, June 5, he stressed the value of the past conferences as an educational event in promoting the spread of better merchandising and gas sales methods.

E. R. Acker, general commercial manager of the Central Hudson Gas and Electric Corporation and vice-chairman of the Commercial Section, extended the welcome of his company to the members of the conference.

The opening address on the program was delivered by C. E. Paige, vice-president of the American Gas Association and vice-president of the Brooklyn Union Gas Company. Mr. Paige discussed the industry's sales job in general and emphasized the stability of public utilities securities as indicated by their reaction to the recent stock market crash and current business depression.

He stated that more intelligently planned and better administered sales programs are the answer to the gas industry's desire for greater business and a better return on investment.

In an address entitled "Hot Water and Health" Dr. W. R. Redden, of the Cleanliness Institute, New York City, gave the members of the Conference many new angles on the health benefits resulting from the sale of water heaters. About 92 per cent of the germs of communicable diseases, he said, entered the body through the nose or mouth, making frequent use of hot water for bathing, and the washing of dishes and clothing a necessity for better health. His talk, in printed form, includes many sales appeals that can be used profitably by those advertising and selling gas water heaters.

H. J. Long, president, Kompak Company, in giving the discussion on Water Heater Sales said:

> *"Your permanent success must depend upon the kind of appliance which your customers use,* and *you* must be the one to set the standard and maintain it. Cooperate with dealers, yes, to the fullest possible extent, but do not for one second lose control of quality of the appliance nor of the quality of service rendered to your customer. Set up your own ideals of service and do not let any red tape, or philanthropic consideration interfere in the accomplishment of this ideal.
>
> "Competition was never greater in all lines than it is today. Gas is competing with other fuels to secure its proper share of the fuel requirements of the people. It is needless to say that the degree of satisfaction which *gas* will give is absolutely dependent upon the degree of satisfaction which the *appliance using gas* will give. The completely satisfied customer cannot be sold by a competitive fuel. A partially satisfied customer may be sold, and a dissatisfied customer will be easily sold."

He was followed by H. E. Dexter, of the Central Hudson Gas and Electric Corporation, who outlined his company's five-year water heater sales program and results. During 1929 one water heater was sold for every fifteen customers and the rate for 1930 to June 1 was one heater for every nine customers. Among other points Mr. Dexter emphasized the need of careful selection and proper training of salesmen, the use of home service workers in explaining the operation of the heater and methods of using hot water profitably, and the offering of low payment plan as the best method of educating people to use gas for water heating. The conversion type of heater sold is so priced as to add $1 a month to the customer's bill for equipment, making the whole monthly bill including gas approximately $4 a month.

James A. Sackett, acting sales manager, Kings County Lighting Company, closed the first session with an address pointing out the educational opportunities open to sales representatives. He referred to the comprehensive educational activities which a number of gas companies are offering their employees and particularly emphasized the Association's salesmen's training courses in domestic and industrial gas and the Sales Management Course which will shortly be made available. He gave many instances of improved earnings on the part of salesmen who have taken courses of this kind and urged all present to take the fullest advantage of these educational opportunities.

Friday morning's session opened with an address "Home Service—Its Place in the Gas Industry," by E. P. Prezzano, vice-president, Westchester Lighting Company, Mt. Vernon, N. Y. Mr. Prezzano gave strongest approval to home service activities as a means of improving sales service and customer relations and outlined the part which home service takes in his company's activities, as a whole. He referred to the rapid growth in the organization of Home Service Departments which were reported as now totalling 331 departments employing 654 workers.

During the discussion Thomas Jabine, of the Central Hudson Gas and Electric Corporation, described the home service activities of his company and indicated that the trend in his territory was toward more home calls and less class sessions. Mr. Jabine stated that 650

home service workers should not be expected to change the habits of the nation, but reported that they were regarded by his company as doing valuable and necessary work in spreading information to promote gas sales and foster the more effective use of gas service.

The subject of gas refrigeration was covered by F. E. Vilas and J. Lobenstein of The Consolidated Gas Company of New York, and Percy Conklin, of the Brooklyn Union Gas Company. These papers were given by men from the refrigeration firing line and proved an outstanding event in the program of the Conference.

Mr. Vilas spoke on promoting refrigerator sales by proper installation and service, and his paper is given in another part of this issue. After outlining The Consolidated Gas Company's installation and service methods he stated that as a result of these methods the ratio of service requests has dropped to the low figure of 1.3 service calls per box per year. Any company interested in the sale of gas refrigerators would do well to give these servicing methods fullest consideration.

In discussing wholesale refrigeration activities Mr. Lobenstein said:

"The prime requisite for successful selling, not only the refrigerator but any article, is a thorough knowledge of the article. This lends confidence to the seller and if the buyer is convinced that the salesman knows his product he will quickly believe what is being presented."

He emphasized the importance of early sales presentations to architects and builders in order that necessary connections may be provided for in the plumbing specifications and so as to assist the architect in making a kitchen layout which will economize in labor and material. In referring to the water charge objections he stated that the local builder in almost every case asks why he should be penalized where there is no similar charge on other automatic refrigeration. This is met, he said, by indicating the policy of his gas company to render free labor service for a period of not less than five years and pointing out that the free labor service more than compensates for the water charge of $2.50 annually per box. Other points of importance mentioned by Mr. Lobenstein were the presentation of a list of users, not as a final reason for the use of the refrigerator but as an indication that he can expect good service because his problem is not so unique as not to resemble some of those who are already using gas refrigeration. Another point of importance was the advisability of investigating credits well in advance of receipt of the order, thus avoiding the annoyances that come from orders held up at the last moment for credit reasons.

Mr. Conklin's paper gave a résumé of his past three years' experience in selling Electrolux at retail and was particularly interesting to those engaged in this branch of the refrigeration field. Numerous hints as to effective sales tactics were included in his talk. Chairman Peters announced that during the month of May Mr. Conklin had established a new record of 38 retail sales.

The closing paper on the second session was delivered by Wm. E. Mills, gas sales engineer for the Glenwood Range Company, Taunton, Massachusetts, who outlined the essentials in a sales program for popularizing the use of gas for cooking. He stressed the necessity of selling modern insulated and heat controlled ranges and recommended that the Association establish standards for determining the relative comfort and heat conservation qualities of the range so as to promote the manufacture of this type of equipment and its use in the home.

A symposium on "House Heating" comprised the entire Friday evening session. At the outset slides illustrating Mr. Prezzano's address of this morning were shown and this was followed by the address of H. M. Brundage, Jr., of the Westchester Lighting Company on "House Heating Sales Methods and Results." Mr. Brundage gave an excellent résumé of sales policies of his department and illustrated the market for house heating in Westchester and results attained, with interesting slides.

He was followed by J. P. Leinroth, Public Service Electric and Gas Company, Newark, New Jersey, who emphasized the fact that social trends were redounding to the benefit of gas house heating activities and were opening up a large market for house heating sales providing a systematic cultivation of the field is inaugurated. After outlining the training and administration methods of his company he stressed the fact that the quotation letter to the prospect is an important part of the sales process and gave it as his opinion that the letter should give the following information:

1. Probable operating cost.
2. Equipment to be installed and its price.
3. Any recommended changes in the present heating system.
4. Statement of company's servicing policy.
5. Review of the advantages of gas heating.

After indicating the policy of his company as regards conversion burners he stated:

"I believe they are going to be more and more important in the picture. As gas rates go down, the first cost of the equipment becomes more and more of a factor and with the first cost a factor the conversion burner should receive due consideration."

While not attempting to discuss the subject of gas house heating rates, he said:

"There is no doubt that properly designed rate schedules have a distinct bearing on house heating sales and that lowering of rates will with the same sales effort result in greater sales, but gas must be sold on its advantages over these other fuels and not on a cost basis."

He summarized his paper as follows:

"Careful study must be given to our market, to proper selection and training of men, to the matter of the number of salesmen we assign to our various territories, to quota fixing, to the number of prospects a man can see per day, to the number he can interest to the point of making a survey, to the number of surveys that can be turned into sales, to effective sales talks, to effective advertising, to effective compensation systems, to proper supervision and follow-up, and to countless other phases of the house heating business. We can all stand putting our selling on a more scientific basis. If we do the selling job the way it should be done we need have no worries over the future of gas house heating."

The concluding paper on house heating was given by F. B. Herty, Brooklyn Union Gas Company, who gave an interesting analysis of the house heating activities of a number of eastern gas companies. These figures were subdivided and classified as to large, medium, and small gas companies, and indicated that large companies may expect to reach a saturation of 3 per cent after 15 years, medium size companies a saturation of 6 per cent in same period, and small companies a saturation of 3 per cent in five years. He pointed out that last year's results from the companies under consideration indicated that one salesman might sell anywhere from 40 to 70 boilers or burners per year and that much work remained to be done in perfecting the most effective type of sales organization for promoting house heating sales.

His analysis indicated that salesman's compensation per job sold varied from $38 to $114 and per thousand cu.ft. of gas sold during the first year from 3 cents to as high as 13 cents.

Major Alexander Forward, Managing Director of the American Gas Association, opened the final session of the conference with an address on the "Sales Department's Place in the Industry's Expansion." He reported that the gas industry was one of the only two or three basic industries showing increased sales records over 1929. He referred briefly to the Association's activities in providing salesmen's courses and sales management studies for the personnel of the sales departments. Special mention was made of the fact that a large group of manufactured gas companies have increased their new business expenditures 300 per cent during the past four years as indicating the increased attention devoted to sales activities. He gave it as his opinion that a greater degree of dealer cooperation should be fostered by the companies and pointed out the need of more adequate advertising programs.

In a paper entitled "Enlisting the Dealer as a Gas Appliance Merchandiser" Hugh Cuthrell, new business manager, Brooklyn Union Gas Company, stated:

"The gas company can get greater results by aiding the plumber in dealer cooperation in the selection of high grade tested appliances than it can in any other way. It should not be forgotten nor be overlooked that any method that is progressive and constructive in appliance merchandising in dealer cooperation is also progressive and constructive for the gas company. It will give the gas user better appliances and introduce the maximum of safety, convenience and economy into the utilization of gas to an extent heretofore impossible. It is to be expected that difficulties will arise in dealer cooperation—and do not forget there have been and still are many difficulties in the ordinary system of appliance merchandising. All the difficulties may never be eradicated from dealer cooperation, but with a reasonable amount of effort, it certainly will not be more difficult to sell the dealer trade, who in turn will sell the individual gas customer, than it is to sell the gas customer directly."

As indicating the results of his company's activities, he said:

"At the present time, our company has water heaters exhibited in 75 plumber dealers' stores. Twelve dealers exhibit a complete line of appliances handled by the gas company. From leads which have been sent in we estimate that upward of 300 plumber dealers are now cooperating with our company in the sale of approved gas appliances.

"We now have consigned to dealers' premises approximately $15,000 worth of gas appliances. These dealers have purchased and sold over $150,000 worth of appliances in six months. One of the large Brooklyn department stores, just getting started in the cooperative sales program, has sold approximately $2,300 worth of ranges within a month. The figures quoted are our net prices on goods delivered from our warehouse. Plumbers have turned in 243 prospects which have resulted in sales, on which they have been paid $2,643 commissions.

A most informative paper on "The Single Meter as a Sales Aid" was given by W. A. Adams, of The Peoples Gas Light and Coke Company of Chicago, Illinois. Ten per cent of all apartments in Chicago are now operated on the single meter plan as a result of activities started about seven years ago but not aggressively promoted until 1928. Mr. Adams cited the advantages to the customers of the company to the single meter plan and his paper was followed by a lively discussion of this subject.

The final speaker was Dr. Daniel Starch, of Daniel Starch and Staff, who gave the results of study of 3,000 advertisements by 160 companies over ten years made to identify the selling appeals which produced the best results. Dr. Starch stated that three points were evident as a result of his study. Most of the sucessful advertisements gave information which was helpful or interesting to the reader. The successful ads were also specific and concrete, rather than of a general nature. Finally, most of the effective ads included copy or illustrations of such a nature as to stimulate curiosity.

In closing the Conference, Chairman Peters thanked those responsible for the success of the meeting and urged all present to utilize the thoughts expressed in his daily work and pass them along to others in the sales departments of the companies represented.

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## Degree is Conferred upon C. N. Lauer

*C. N. Lauer*

CONRAD N. LAUER, a vice-president of The United Gas Improvement Company and president of Philadelphia Gas Works Company, was the principal speaker at the fifty-eighth commencement of Stevens Institute of Technology, Hoboken, N. J., June 7, and was one of four to receive honorary degrees. Harvey Nathaniel Davis, president of the Institute, presided, and degrees were conferred by Walter Kidde, chairman of the board of trustees. Mr. Lauer received the honorary degree of mechanical engineer as "an operating engineer proven by years of recognized attainment."

Mr. Lauer, who is the founder of the Herbert Hoover medal, annually to be awarded to an engineer distinguishing himself in public service, is also president of the Ugite Sales Corporation and Utilities Realty Company; vice-president, Regional Planning Federation of the Philadelphia Tri-State District, and of the Philadelphia Chamber of Commerce; secretary, Philadelphia Gas Commission and a director or member of numerous industrial corporations, governmental and civic commissions and technical societies.

# Sixth New England Regional Sales Conference

THE Sixth New England Regional Gas Sales Conference, sponsored jointly by the Sales Division, New England Gas Association, and the Commercial Section, American Gas Association, was held under auspicious circumstances at the Griswold Hotel, New London, Connecticut, on Friday and Saturday, June 13 and 14. With 240 members and guests attending a strong program of sales discussions, emphasizing gas refrigeration, competitive sales tactics, and dealer cooperation activities featured the sessions.

An executive conference of the New England Gas Association was held on Thursday evening, preceding the conference. Reports were made on the progress and finances of the regional cooperative advertising campaign and plans for the future were discussed. Results of the gas industry's participation at the Eastern States Exposition, Springfield, Massachusetts, were disclosed and plans were discussed for participation in the Brockton Fair and the exhibit of the National Association of Master Plumbers in Boston.

C. D. Williams, executive secretary of the association, reported on a special investigation outlining the possibilities of group purchase of workmen's compensation insurance by the New England gas industry and a plan of action was agreed upon to pursue this matter further.

J. H. Sumner, of the Cambridge Gas Light Company, chairman of the New England Regional Sales Council, welcomed those attending the first meeting of the conference and introduced H. Vittinghoff, president of the New England Gas Association.

Mr. Vittinghoff appealed for greater cooperation among the production, distribution, and sales branches of the industry and urged that load building be recognized as the chief aim of every gas company. He stressed the importance of adopting a suitable yardstick to measure successful selling activities as one of the national needs of the industry today.

In opening a symposium on gas refrigeration, R. L. Hallock, The Brooklyn Union Gas Company, Brooklyn, New York, told of the swing toward gas refrigeration in many parts of the country and urged all companies represented to take advantage of this trend with aggressive refrigeration activities. In describing the selling methods of his company, he stated that a $5 bonus to each gas company employee turning in a productive lead explained 40 per cent of his company's sales during the first year. Trade and dealer cooperation, Mr. Hallock said, was another important factor in the successful selling of gas refrigerators. The experience of his company indicated the desirability of salesmen working separately on wholesale and retail business, where the size of the territory warranted this. He stated that in their territory three calls are usually necessary to close a sale, the last call usually being made at night when the whole family is available for making a final decision.

Thomas F. Murphy, of the Pittsfield Coal Gas Company, outlined the sales methods of his company operating in a smaller territory and indicated that special arrangements for employee purchase had proved an important factor in the success of their activities. It was evident from his talk that the promotion of gas refrigeration in the territories of the smaller companies did not require methods differing materially from those which have proved successful with larger companies. Frequent newspaper advertising, thirty-day free trials with easy purchase terms and careful attention to servicing were indicated as essential items.

William G. Keay, of the Associated Gas and Electric System, opened his paper with an appeal to the gas men present to show more evidence of personal pride in the services that gas renders in the home and industry. The campaign on gas refrigeration in Associated territory was carefully planned and outlined in a comprehensive booklet distributed in advance to every employee and resulted in the sale of 1850 gas refrigerators in six weeks. He reported that employee purchase of gas refrigerators was an important preliminary step in the success of the Associated campaign. His sales manual indicated that he had overlooked none of the recommended methods of bringing the advantages of gas refrigeration strikingly to the attention of the public.

George E. Whitwell, the next speaker of the program, was introduced by Mr. Vittinghoff. In discussing the subject of electric competition from the standpoint of a combination company, Mr. Whitwell recommended the following tests in determining the company policy.

1. Which service will do the job best for the customer.
2. Which load will produce the maximum gross and net revenue for the company with the minimum investment.

After recommending that every combination company make an announcement of its policy on these matters, Mr. Whitwell outlined the various methods of promoting the sale of gas in competition with other fuels. "Every employee a salesman," and proper understanding of the sales problem by every operating and accounting man were indicated as important factors. Salesmen's compensation, trade and dealer cooperation, the sale of the best type of appliances and effective utilization of the home service department, were other suggested tools. Finally, adequate and ever ready service, and gas rates recognizing prevailing competition were held necessary. In concluding Mr. Whitwell summarized his paper by saying that there was no lack of information as to the best methods of meeting competition and indicated that the solution of this problem, in his opinion, was largely a question of "the will to do" on the part of the gas companies.

He was followed by A. L. Kebbe, Connecticut Power Company, New London, Connecticut, and Harry O. King, Standard Gas Equipment Corporation, of Boston. Mr. Kebbe discussed in further detail the methods of meeting the competition mentioned by Mr. Whitwell and gave examples of these activities in the territory of the Connecticut Power Company. He strongly advocated dealer cooperation stating that the thirty-five plumbers cooperating in New London had proved of real help in selling high quality water heaters.

Promotional gas rates and a high type of sales personnel were urged by Mr. Kebbe, who also pointed out the necessity of getting architects and builders to specify and provide ample flues.

Mr. King outlined the advantages of gas for baking and cooking and quoted the results of food tests made in Boston hotels indicating that competitive claims as to greater shrinkage of food in gas ovens were without foundation.

A special meeting of the home service workers of New England was held simultaneously with the Friday afternoon session of the conference at which Miss Florence Chisholm, Malden and Melrose Gas Co., presided. Miss Margaret Ingels, of the Carrier-Lyle Corporation, spoke on "Weather Making in the Home" and those present discussed the promotion of courses for home service workers in New England colleges.

Saturday morning's session opened with a paper by W. C. Beckjord, vice-president, Boston Consolidated Gas Company, entitled "The Gas Industry's Job in New England from a Newcomers' Standpoint." Due to illness in Mr. Beckjord's family, this paper was read by F. D. Cadwallader, vice-president, Boston Consolidated Gas Company. It comprised an excellent treatise on the part of the gas company management in the sales program and development of the gas industry.

Dr. W. W. Peter, of the Cleanliness Institute, New York, followed with a most valuable and interesting talk on "Water Heating from the Health Angle." He indicated that on the average there are about two million and a third Americans so ill as to require medical attention and pointed out the fact that this condition is costing American citizens about one-ninth of their annual income.

The promotion of better health, he said, would release a tremendous part of this national income for other purposes and would thus constitute a business promotion factor.

## Accounting Section

J. L. CONOVER, Chairman H. W. HARTMAN, Secretary J. I. BLANCHFIELD, Vice-Chairman

# Chicago Company Favors "Therms" for Billing Gas

A RATE schedule under which it proposes to bill its customers on the basis of the heat units used, rather than on the volume of gas consumed, has been filed with the Illinois Commerce Commission by The Peoples Gas Light and Coke Company.

Specifically the company proposes to issue its bills expressed in "therms," or heat units, rather than in cubic feet, as at present. A therm is 100,000 B.t.u. or standard heat units.

The therm basis of billing, as proposed, contemplates no change in the cost of gas service to the customer. The present cubic foot rates will be continued in effect as optional, so that any customer desiring to do so may continue to receive his bills calculated upon the basis of the cubic feet of gas used.

One important reason for the change, according to George F. Mitchell, president of The Peoples Gas Light and Coke Company, is the fact that the gas supply of the company will be augmented by natural gas during 1931 through the completion of a 950-mile pipe line from the Texas Panhandle.

Plans for this pipe line were announced in April of this year by Insull Son & Co., Inc., which named as its associates in the project Cities Service Company, Standard Oil Company (of New Jersey), The Texas Company, Phillips Petroleum Company, Skelly Oil Company, and Columbian Carbon Company. Construction of the line, it was stated at that time, is to be carried on under the direction of Henry L. Doherty and Company.

"It is safe to say that this pipe line will be completed during 1931," said Mr. Mitchell. "The company's product then will be a mixture of natural and manufactured gas. It will have a substantially greater heating value per cubic foot than the gas now supplied, and the customer will use less gas by volume to obtain the same results in cooking or heating generally. The exact proportion of the mixture is an operating problem of the company and has not yet been determined. Under the therm basis of billing the customer will pay only for the heating value of the gas furnished, regardless of the volume of the gas in which the heating value is contained.

"If the commission approves our proposal to bill our customers on the therm basis for the several months preceding the introduction of natural gas, the fairness of the new system of billing will have been established and the change from the present fuel to one of a different heating value will be effected without creating any confusion in the minds of our customers. The proposed therm rates are so designed that no change will be made in the cost

AMOUNT OF MONTHLY BILL BY STEPS OF CONSUMPTION AT GENERAL RATE NO. 1

*Present Rate*

| *Cu.ft.* | *Charge* |
|---|---|
| First 400 | $.60 |
| Next 49,600 | .90 per 1,000 cu.ft. |
| Over 50,000 | .85 per 1,000 cu.ft. |

Minimum charge per month 60c

*Proposed Therm Rate*

| *Therms* | *Charge* |
|---|---|
| First 2 | 58c |
| Next 24 | 17c per therm |
| Next 239 | 16.9c per therm |
| Over 265 | 16c per therm |

Minimum charge per month 60c

| *Monthly Consumption Cu.ft.* | *Therms* | *Amount of Monthly Bill on Present Rate* | *Amount of Monthly Bill on Proposed Therm Rate* | *Reduction in Monthly Bill* |
|---|---|---|---|---|
| 0 | 0 | $ .60 | $ .60 | — |
| 200 | 1.06 | .60 | .60 | — |
| 400 | 2.12 | .60 | .60 | — |
| 600 | 3.18 | .78 | .78 | — |
| 800 | 4.24 | .96 | .96 | — |
| 1,000 | 5.30 | 1.14 | 1.14 | — |
| 1,200 | 6.36 | 1.32 | 1.32 | — |
| 1,400 | 7.42 | 1.50 | 1.50 | — |
| 1,600 | 8.48 | 1.68 | 1.68 | — |
| 1,800 | 9.54 | 1.86 | 1.86 | — |
| 2,000 | 10.60 | 2.04 | 2.04 | — |
| 2,200 | 11.66 | 2.22 | 2.22 | — |
| 2,400 | 12.72 | 2.40 | 2.40 | — |
| 2,600 | 13.78 | 2.58 | 2.58 | — |
| 2,800 | 14.84 | 2.76 | 2.76 | — |
| 3,000 | 15.90 | 2.94 | 2.94 | — |
| 4,000 | 21.20 | 3.84 | 3.84 | — |
| 5,000 | 26.50 | 4.74 | 4.74 | — |
| 6,000 | 31.8 | 5.64 | 5.64 | — |
| 7,000 | 37.1 | 6.54 | 6.54 | — |
| 8,000 | 42.4 | 7.44 | 7.43 | .01 |
| 9,000 | 47.7 | 8.34 | 8.33 | .01 |
| 10,000 | 53.0 | 9.24 | 9.22 | .02 |
| 11,000 | 58.3 | 10.14 | 10.12 | .02 |
| 12,000 | 63.6 | 11.04 | 11.01 | .03 |
| 13,000 | 68.9 | 11.94 | 11.91 | .03 |
| 14,000 | 74.2 | 12.84 | 12.81 | .03 |
| 15,000 | 79.5 | 13.74 | 13.70 | .04 |

of gas service to any customer at this time. Reductions in the level of the rates, consequent upon the introduction of natural gas, must await more exact information than is now available to the company. Meantime the step now proposed is a constructive one in the direction of adjusting the community and the company to the anticipated change in conditions.

"The merit of the therm basis of billing has been established by its use in other countries for the past several years. The gas is measured by the customer's meter on a cubic foot basis the same as at present. Its value in heat units is then easily computed according to standards set by the Commerce Commission.

"The proposed change in billing is a logical development in the advance of the gas business. Formerly when gas was used principally as a source of light it was valued by its candle power. Today, when its lighting use has practically ceased and it has become a source of heat energy, it is the universal practice to value it by its heat content, and it is only natural that it should be billed accordingly.

"It should be understood that the new schedule does not cancel the present one. If after a trial of the new method any customer prefers to be billed upon the present volumetric basis he may again have his charges so computed upon application. It seems unlikely that any considerable number of customers will desire to revert to the old method of billing, since it will offer them no advantage in the cost of the service. Necessarily, when the heating value of the gas is changed, the cubic foot rates, if still in use by any customers, will have to be so adjusted as to keep the cost of gas service under them in conformity with its cost under the therm basis of billing."

The table below shows the charges for various quantities of gas up to 15,000 cu.ft. per month, when billed on the present cubic foot basis and when billed on the proposed therm basis, at the general household rates of the Peoples Company, which are the rates applicable to the great majority of its customers. There is no difference until the monthly consumption reaches 8,000 cu.ft. and even then the difference is trifling.

## The Present Coke Situation

(Continued from page 297)

gas. From this it necessarily follows that the utilization and disposal of the additional coke resulting from increased coal and coke oven gas production must be of increasing concern to the average company so situated.

Another factor sometimes neglected in discussions of the coke situation is the relatively large amounts of retort coke produced in the manufacture of retort coal gas. Our compilations indicate that in 1928 there were nearly 3 million tons of retort coke produced by gas utilities of which 1,400,000 tons or nearly 50 per cent, were sold. The full significance of this figure is emphasized when we consider that there were only 2,791,500 tons of by-product coke produced in plants owned by gas utilities, of which 1,570,900 tons, or about 56 per cent, were sold. While corresponding data for 1929 are not yet complete, preliminary estimates indicate that the situation was somewhat reversed in that year the production of retort coke dropping to 2,650,000 tons, while by-product coke produced in plants owned by gas utilities rose to nearly three and a half million tons in 1929.

However, from the material at hand it would appear that as far as concerns the industry at large, coke sales are not showing the proportionate increase that might be anticipated from the changing trends in production that have been discussed above. A surprisingly large proportion of the coke available from increased coke oven gas production is being absorbed within the industry itself. The magnitude of this change can best be realized when we consider that from 1919 to 1928 the total amount of bituminous coal consumed for all purposes by the manufactured gas industry increased only 15 per cent, total oil consumed increased only 1 per cent, while the anthracite consumed by the industry in 1928 was only 22 per cent of the amount used in 1919. At the same time the coke consumed by the industry itself for all purposes in 1928 was nearly three times such use in 1919, or an increase of some 180 per cent.

In concluding this brief summary, it may be stated that the problem of coke merchandising must continue to merit increasing study and attention, first because of the changing production policies of the gas industry at large, which involves not only the production of additional coke in increasing quantities, but also the necessity of finding markets for the coke formerly consumed in the manufacture of water gas, and second because up to the present the domestic market has undoubtedly constituted the most profitable outlet for by-product coke, but unfortunately it appears highly probable that the price structure of nearly all domestic fuels is going to be subjected to increasingly severe competitive pressure during the next few years. Among the factors tending toward lowered price levels for domestic fuels may be enumerated the surplus of natural gas in the Southwest, the surplus of fuel oil, as well as the large number of new by-product coke plants going into operation.

It should also be considered that according to estimates of the Bureau of Mines, there is unused anthracite capacity capable of producing each year an additional 10 million tons of this fuel as well as unused bituminous capacity sufficient to produce an additional 40 million tons of bituminous coal.

These are all factors which should be accorded serious consideration in formulating plans and methods of merchandising coke.

## Mr. Corl Elected

*W. F. Corl*

WILEY F. CORL has been elected a vice-president of The United Gas Improvement Company. He is president of Commonwealth Utilities Corporation and became associated with U. G. I. late last year when U. G. I. acquired a controlling interest in that company, whose subsidiaries operate in fifty-three communities.

## Publicity and Advertising Section

JAMES M. BENNETT, Chairman ALLYN B. TUNIS, Secretary DONALD M. MACKIE, Vice-Chairman

# Urges Closer Contact With Press

AT the Annual Convention of the Public Utilities Advertising Association held in Washington, May 19-20-21, "The Newspapers' Viewpoint of the Utilities Obligation" was discussed by Owen A. Conner, financial editor of the PUBLIC LEDGER, Philadelphia.

"From the viewpoint of the newspaper it is a wise policy on the part of utilities, casting aside all question of obligation, to cooperate with the newspaper in presenting all interesting and important information to the public promptly through the news columns and through advertising space," he said. "Readers look to the newspaper for detailed information concerning the utility corporation's progress, its plans for expansion, its adoption of new methods of operation, its changes in executive personnel, its earnings, its rate changes and its relationships with public service commissions and other public officials.

"The day when the public was satisfied with brief statements on important subjects affecting representative corporations has passed. Stock ownership, once in the hands of a few, has broadened out so that today thousands of persons of moderate means own shares in one or more public utilities. Many others are prospective stockholders, for the great progress made by utilities in recent years and the outlook for still greater progress in the light and power industry have stirred the public imagination to an appreciation of the probabilities of profit through partnership in one or more of these corporations.

"This broad ownership gives the newspaper readers' interest in public utility affairs a new importance, for it takes it out of mere curiosity and gives it force in that the reader desires information for the purpose of protecting money already invested and for the purpose of investing profitably his newly accumulated savings. Therefore, the newspaper must, as a matter of duty, strive to publish day-by-day all that has happened to affect the properties in which its readers have become partners.

"The newspaper believes that every such corporation should designate one of its officials to receive inquiries from newspapers. The newspaper would prefer that this information come from one source in the corporation. The official designated to maintain contacts with the newspapers should be a man of such ability and discretion that he could be trusted with all essential information concerning his corporation so that his replies to newspaper inquiries might be genuinely informative.

"This contact official, being fully informed as to the plans of the corporation, could cooperate at all times with the newspaper to the advantage of all concerned—the utility, the newspaper and the newspapers' readers.

"It would facilitate closer and better cooperative understandings among the newspapers and utilities if the official designated as the news contact were also to direct the advertising. In that way points that might come into dispute could be adjusted quickly and serious misunderstandings could be avoided."

## Irving M. Tuteur Heads P. U. A. A.

THE following officers were elected at the annual meeting of the Public Utilities Advertising Association in Washington, May 21.

*I. M. Tuteur*

President, Irving M. Tuteur, McJunkin Advertising Co., Chicago, Ill.; vice-presidents, R. S. McCarty, Philadelphia Company, Pittsburgh, Pa.; R. E. Haas, Columbia Gas & Electric Corporation, New York City; E. Frank Gardner, Midland United Corp., Chicago, Ill.; secretary, J. R. Pershall, Public Service Company of Northern Illinois, Chicago, Ill.; treasurer, Howard F. Weeks, Consolidated Gas Company, New York City.

Directors—George F. Oxley, National Electric Light Association, New York City; Labert St. Clair, American Electric Railway Association, New York City; Frank L. Blanchard, Henry L. Doherty & Co., New York City; Dana H. Howard, Commonwealth Edison Co., Chicago, Ill.; Henry Obermeyer, Consolidated Gas Company, New York City; Stanley Quinn, Electric Bond & Share Co., New York City; B. J. Mullaney, The Peoples Gas Light & Coke Co., Chicago, Ill.; Keith Clevenger, American Gas Association, New York City; J. S. S. Richardson, New York City; William H. Hodge, Byllesby Engineering & Management Corp., Chicago, Ill.; Donald M. Mackie, Commonwealth & Southern Corp., Jackson, Mich.; Louis D. Gibbs, Edison Electric Illuminating Company of Boston, Boston, Mass.; J. C. Barnes, New Orleans Public Service Inc., New Orleans, La.; James M. Bennett, The Philadelphia Electric Co., Philadelphia, Pa.

## Central Hudson Wins P. U. A. A. First Prize

ONE of the most interesting features of the meeting of the Public Utilities Advertising Association held in Washington, D. C., May 20 and 21, was the award of five silver cups and eighteen certificates as prizes in the nation-wide "Better Copy" contest.

The Central Hudson Gas and Electric Corporation of Poughkeepsie, N. Y., won first prize in the gas commercial division of the contest.

The second prize was won by the New York Power and Light Corporation, of Albany, N. Y., and the third prize certificate was awarded to the Union Gas and Electric Company, of Cincinnati, Ohio. The entire list of the winning advertisements are printed in the 1930 Portfolio of Public Utility Advertising, which was published recently.

## Standard Oil Forms Management Corporation

THE formation of the Standard Management and Operating Corporation by the Standard Oil Company of California recently was announced.

## Natural Gas Department

H. C. MORRIS, Chairman — E. J. STEPHANY, Secretary — H. C. COOPER, Vice-Chairman

# Entertained Visitors At New Orleans

NO small credit in making the entertainment program of the annual convention of the Natural Gas Department, American Gas Association, which took place at New Orleans in May, an outstanding success was due to fifty girls who served on the various committees. Herewith is presented a group picture of those attractive New Orleans ladies. They are as follows:

Back row, standing—Elizabeth Moore, Irene Rand, Lillian Heft, Virgie Fisher, Heloise Philippi, Anna Mooney, Elise Burguieres, Eoline Salassi, Philo Tobin, Kate Fleming, Nelie Everett, Elsie Sherlock, Estelle Bowers, Mabel Niemeyer, Catherine Howe, Alice Cooper, Eva Dietlein, Elizabeth Ferguson, Margaret Campbell, Ethel Ryan, Ruby Simon.

Center row, kneeling—Norma Kirkpatrick, Talie Plaisson, Miriam Jesse, Juliette Berthelot, Hyacinth Joyce, Margaret Finley, Elizabeth Bell, Marguerite Hugo, Katherine Fitzpatrick, Claire Rainey, Bess Pigue, Margaret Moore, Leah McMahon, Almira Dauenhauer, Corinne Fleetwood.

Bottom row, seated—Dickie Waggaman, Dot Grube, Mildred Roome, Mattie Bell Maxwell, Bertha Sondes, Henrietta Myers, Henrietta Bayle, General Chairman, Elaine Baxter, Edith Mavor, Leila Wren, Ethel Reilly, Mabel Triay and Dorothea Schlesinger.

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## Natural Gas Leakage Easily Detected

THE detection of leakage is a recognized problem in the safe and economic distribution and use of natural gas. That type of fuel gas is practically odorless and therefore lacking in the property of indicating significant leakage by the sense of smell, the most valuable and widely used means of apprising gas employees and consumers of leaks of the more odorous types of fuel gases. Physically and chemically operated detecting devices have been developed and are of assistance in making organized leak surveys and in investigating suspected leakage, but none of these meets the necessity of spontaneously indicating the location of leakage at the time of occurrence.

The United States Bureau of Mines, at its Pittsburgh Experiment Station, has been interested in the detection of leakage of fuel gases for a number of years, and particularly the leakage of types of gas that do not possess indicating or warning properties as odor or irritation. In view of this interest and also the recognized value of the odor for detecting leakage of the more odorous types of gases, the bureau studied the possibilities of adding small amounts of highly odorous substances to odorless types of fuel gas, as blue water gas and natural gas, for the purpose of imparting an odor to the gas that would be readily perceptible and thereby serve as a means of detection.

The results of the previous studies indicated that ethyl mercaptan was a very promising odorizing substance for natural gas. This has recently been substantiated by tests made in distributing systems of the Union Gas and Electric Company.

## Promoting Refrigerator Sales by Proper Service

(Continued from page 310)

will be lost in an avalanche of service calls.

As our summary chart (full scale reproductions of this chart are available) of ratios shows, we have reached a low point of 1.3 calls per box per year and can reach lower, possibly some of you can look along the chart to your number of installations and can see how the future appears. On one peak day in May, 1930, the calls received for service per refrigerator operating were exactly one-half of the calls received per refrigerator in service in 1929. Such a figure can only point to the fact that with adequate education of employees and analysis of conditions, the gas refrigerator load can be made a profitable one. In conclusion I may safely say that gas refrigeration is only on the threshold of a universal application that will be as profitable as it is stupendous.

## Industrial Gas Section

C. C. KRAUSSE, Chairman C. W. BERGHORN, Secretary D. W. CHAPMAN, Vice-Chairman

# Accurate Data Necessary for Successful Selling

THROUGHOUT the field survey which was made as a basis for the American Gas Association Course in Industrial Gas Salesmanship, one outstanding defect in the methods used by typical industrial gas salesmen was recurrently brought to light: They frequently record important data in a haphazard fashion. Time and again, salesmen of undisputed ability in other directions were observed to use the backs of old envelopes and loose sheets of "scrap paper" in setting down facts obtained in interviews and operating tests. This practice has three grave disadvantages:

1. It tends to diminish the importance of the survey in the eyes of the prospect, because it conveys the impression of lack of planning and carelessness.
2. It adds unnecessarily to the salesman's work, making it necessary for him to transcribe his figures from one sheet to another and to identify his figures by writing in his own headings, and complicating his calculations by requiring reference to several separate sheets at once.
3. It makes for inaccuracy and confusion in recording, because of the space limitations of the sheets generally used; and because of the difficulty which others, who may be interested in seeing the data, have in deciphering the salesman's abbreviations and hieroglyphics.

Several instances were mentioned by sales managers where lost envelopes on which data has been recorded, and inadequately identified figures, make it necessary for the gas company to repeat at considerable expense, operating tests already made. Such occurrences reflect on the gas company; and they are evidences of inexcusable carelessness on the part of the salesman.

Where the survey is in the hands of an expert engineer supplied by the gas company, or an equipment manufacturer, the responsibility for the recording of data lies, of course, in his hands; the salesman is still under the necessity of preparing his proposal for the prospect, and to that end, must have some convenient means of analyzing the facts and working up his recommendations.

In order to avoid the dangers inherent in the loose recording of important facts, and to aid the salesman in rapidly interpreting his data and drawing the correct conclusions, several gas companies have prepared standard forms, which are being used with great success by their salesmen. The best features of these forms have been combined into five composite charts which are used with the Survey of Heat Uses and Requirements included in the A. G. A. Course in Industrial Gas Salesmanship as follows:

Chart I. Fuel costs
Chart II. Analysis of costs other than fuel
Chart III. Report of operating tests
Chart IV. Industrial heating report
Chart V. Recommended equipment report

These charts not only eliminate some of the serious disadvantages under which many salesmen are working, but also provide the salesman with the best possible selling ammunition when the time comes for the submission of his proposal.

After the salesman has completed his analysis of his prospect's fuel uses and needs, or after he has received from the expert who has conducted the survey, complete data on the plant's heating operation, he still has two important tasks ahead of him before he can help to realize on his and his company's efforts:

(a) He must draw the correct conclusions from the facts he has obtained; or, if the conclusions have already been arrived at by an expert who has participated in the survey, the salesman must verify them in the light of his own knowledge of the situation; and
(b) He must prepare his proposal for submission to the prospect.

One great advantage in using charts of the kind furnished with the course for recording the data of the survey of heat uses and requirements, is that they unmistakeably and at once bring to light the needed changes in the prospect's use of fuel, and in his equipment. The results which the prospect is obtaining with his present fuel and equipment are shown in Charts I, II and III which contain the data on fuel costs, costs other than fuel, and of operating tests which may have been conducted. Chart IV provides a simple means for summarizing this information and for making a comparison of the results obtainable with the prospect's present fuel and with gas for any or all of the processes in his plant.

Even if the survey has been conducted by an engineer who has used another method of recording data, and he submits his findings to the gas company in the form of a typewritten memorandum or report, the salesman will find it well worth his while to summarize the data contained in the expert's report on record-forms similar to the charts, in order to provide a clear and readily comprehended picture of the fuel situation in the prospect's plant. Once the information called for by Charts I, II, III and IV has been obtained, the conclusions become obvious to any open-minded engineer. It must be kept in mind, however, that not all prospects are entirely open-minded; most of them, in fact, set up an instinctive defense against "selling" in any form, no matter how sensible its basis. The preparation of recommendations for submission to the prospective gas user presents, therefore, a serious and important problem. The proposal is the climax of the salesman's efforts; it is the means by which he helps to capitalize the time and energy he has put into his examination of his prospect's heating requirements.

The survey made in the preparation of the course showed conclusively that most salesmen have been experiencing great difficulty in this important phase of their work. Instance-after-instance was brought to light in which salesmen involved their companies and themselves into expenditures of considerable amounts of money and time in order to uncover the facts about their prospect's heating application; and yet, when these facts were at hand, made relatively little—and certainly, not effective—efforts to use the material they had obtained in selling gas installations.

The methods in vogue up to the present time for making recommendations to prospects, leave much to be desired.

The detailed report is generally costly to prepare and difficult and uninteresting to read.

The summarizing letter is incomplete; that is, it presents conclusions without showing the reasons for them or their real importance to the prospects and is likely to create unnecessary sales resistance to the financial outlay proposed.

The verbal proposal is generally not carefully planned, subject to frequent interruptions and is likely to result, even under the most favorable circumstances, in only a small sale.

(Continued on page 330)

# Monthly Summary of Gas Company Statistics

## FOR MONTH OF APRIL, 1930

Issued June, 1930, by the Statistical Department of the American Gas Association
420 Lexington Avenue, New York, N. Y.

PAUL RYAN, Statistician

### COMPARATIVE STATISTICS OF 143 MANUFACTURED GAS COMPANIES FOR MONTH OF APRIL, 1930

| | *Month of April* | | | *Four Months Ending April 30th* | | |
|---|---|---|---|---|---|---|
| | *1930* | *1929* | *Per cent Increase* | *1930* | *1929* | *Per cent Increase* |
| Customers | 8,835,930 | 8,673,264 | 1.9 | | *See April* | |
| Gas Sales (MCF) | 31,943,694 | 30,005,945 | 6.5 | 128,879,324 | 124,814,541 | 3.3 |
| Revenue (Dollars) | 33,008,128 | 31,741,999 | 4.0 | 134,286,725 | 131,564,808 | 2.1 |
| *Gas Produced and Purchased (MCF)* | | | | | | |
| *Gas Produced* | | | | | | |
| (a) Water Gas | 16,459,921 | 16,628,016 | — 1.0 | 69,460,066 | 72,913,202 | — 4.7 |
| (b) Coal Gas | 2,580,001 | 2,574,632 | 0.2 | 10,618,432 | 10,727,605 | — 1.0 |
| (c) Oil Gas | 602,495 | 697,196 | —13.6 | 3,077,741 | 3,303,923 | — 6.8 |
| (d) Coke Oven Gas | 4,100,004 | 3,859,242 | 6.2 | 16,182,434 | 15,253,431 | 6.1 |
| (e) Reformed Oil Still Gas | 142,185 | —— | — | 398,800 | —— | — |
| (f) Total Gas Produced | 23,884,606 | 23,759,086 | 0.5 | 99,937,473 | 102,198,161 | — 2.2 |
| *Gas Purchased* | | | | | | |
| (a) Coke Oven Gas | 9,226,806 | 8,433,846 | 9.4 | 37,818,356 | 32,908,401 | 14.9 |
| (b) Oil Still and Natural Gas | 204,649 | 249,172 | —17.9 | 897,126 | 1,094,020 | —18.0 |
| (c) Total Gas Purchased | 9,431,455 | 8,683,018 | 8.6 | 38,715,482 | 34,002,421 | 13.9 |
| Total Gas Produced and Purchased | 33,316,061 | 32,442,104 | 2.7 | 138,652,955 | 136,200,582 | 1.8 |

### COMPARATIVE STATISTICS OF 68 NATURAL GAS COMPANIES FOR MONTH OF APRIL

| | | | | | | |
|---|---|---|---|---|---|---|
| *Customers* | | | | | | |
| Domestic (Including House Heating) | 3,401,600 | 3,330,616 | 2.1 | | | |
| Commercial | 166,414 | 159,374 | 4.4 | | | |
| Industrial | 9,638 | 13,389 | —28.0 | | | |
| Main Line | 444 | 244 | 82.0 | | *See April* | |
| Miscellaneous | 2,237 | 1,201 | — | | | |
| Total (64 companies which segregate) | 3,580,333 | 3,504,824 | 2.2 | | | |
| Grand Total (68 companies) | 3,599,554 | 3,522,308 | 2.2 | | | |
| *Gas Sales (MCF)* | | | | | | |
| Domestic (Including House Heating) | 21,479,399 | 19,608,520 | 9.5 | 98,149,101 | 99,432,315 | — 1.3 |
| Commercial | 2,661,134 | 2,353,931 | 13.1 | 12,500,086 | 12,607,173 | — 0.8 |
| Industrial | 9,555,734 | 10,074,488 | — 5.2 | 39,071,975 | 40,640,997 | — 3.8 |
| Main Line | 1,749,933 | 2,190,366 | —20.1 | 7,222,892 | 8,681,610 | —16.8 |
| Miscellaneous | 60,405 | 50,222 | — | 497,972 | 790,408 | — |
| Total (64 companies which segregate) | 35,506,605 | 34,277,527 | 3.6 | 157,442,026 | 162,152,503 | — 3.0 |
| Grand Total (68 companies) | 35,660,086 | 34,451,677 | 3.5 | 158,392,794 | 163,027,614 | — 2.8 |
| *Revenue (Dollars)* | | | | | | |
| Domestic (Including House Heating) | 14,431,781 | 13,448,386 | 7.3 | 65,217,927 | 65,925,195 | — 1.1 |
| Commercial | 1,543,947 | 1,377,972 | 12.0 | 7,122,486 | 6,998,394 | 1.8 |
| Industrial | 3,037,715 | 3,292,815 | — 7.8 | 12,296,891 | 13,364,198 | — 8.0 |
| Main Line | 247,635 | 296,826 | —16.6 | 1,028,197 | 1,187,140 | —13.4 |
| Miscellaneous | 35,092 | 29,293 | — | 294,040 | 413,333 | — |
| Total (64 companies which segregate) | 19,296,170 | 18,445,292 | 4.6 | 85,959,541 | 87,888,260 | — 2.2 |
| Grand Total (68 companies) | 19,383,702 | 18,534,880 | 4.6 | 86,446,721 | 88,320,326 | — 2.1 |
| *Gas Produced and Purchased (MCF)* | | | | | | |
| Natural Gas Produced | 10,281,785 | 8,825,543 | 16.5 | 47,271,825 | 48,873,237 | — 3.3 |
| Natural Gas Purchased | 33,559,654 | 33,045,361 | 1.6 | 154,433,705 | 152,250,044 | 1.4 |
| Natural Gas Produced and Purchased | 43,841,439 | 41,870,904 | 4.7 | 201,705,530 | 201,123,281 | 0.3 |
| Manufactured Gas Produced and Purchased | 2,107,790 | 3,384,942 | —37.6 | 9,982,025 | 16,276,735 | —38.7 |
| Total Gas Produced and Purchased | 45,949,229 | 45,255,846 | 1.5 | 211,687,555 | 217,400,016 | — 2.6 |
| Company Use and Sales to other Gas Companies | 9,043,980 | 8,575,006 | 5.5 | 44,166,678 | 43,749,831 | 1.0 |
| Net Available for Public Distribution | 36,905,249 | 36,680,840 | 0.6 | 167,520,877 | 173,650,185 | — 3.5 |

NOTE: Of the sixty-eight reporting companies, sixty-four segregate customers, sales and revenue, while four companies report only totals. The data shown for the domestic, commercial, industrial and main line classifications are based only on the reports of the sixty-four companies which segregate items.

THE month of April witnessed substantial improvement in nearly all phases of the gas industry. According to returns from companies representing nearly 90 per cent of the manufactured gas division of the industry, April sales aggregated 31,943,694,000 cu.ft., an increase of 6.5 per cent over the same month of the preceding year. A group of the larger natural gas companies, representing approximately 70 per cent of the public utility distribution of natural gas, report sales of 35,660,086,000 cu.ft. for April, as compared with 34,451,677,000 cu.ft. sold by the same companies in April, 1929, an increase of 3.5 per cent in natural gas sales. The results for this group of natural gas companies would have been considerably better were it not for the generally depressed state of business and industry still characterizing most sections of the country. This is reflected in a decrease of more than 5 per cent in sales of natural gas for industrial purposes during the month. Natural gas sales for domestic and house heating purposes, however, registered a gain of nearly 10 per cent, while commercial sales, mainly to hotels, restaurants, public buildings, etc., gained 13 per cent.

This retardation in gas sales for industrial uses was not confined to the natural gas part of the industry, as manufactured gas companies in New England reported a drop of 1 per cent in industrial-commercial sales. In the East North Central States the decline in this class of business during April amounted to more than 4 per cent, with Indiana showing a loss of nearly 7 per cent. In Michigan the decrease in industrial-commercial sales amounted to nearly 10 per cent.

The steady and persistent growth in number of customers continued during the first four months of 1930. As of April 30th, customers served by the manufactured gas companies aggregated 8,835,930, a gain of some 2 per cent, while those served by the reporting natural gas companies totalled 3,599,554, an increase of 2.2 per cent from April 30th of the preceding year.

The tendency to provide for manufactured gas requirements by purchased gas continued during this four-month period, the manufactured gas produced showing a decline of 2.2 per cent from the initial four months of 1929. This was the result in large part of a decrease of nearly 5 per cent in water gas production, of 1 per cent in coal gas production and a 7 per cent decline in oil gas production. Coke oven gas produced by the utilities themselves increased 6 per cent during the period, while coke oven gas purchased from merchant by-product coke companies and concerns affiliated with the iron and steel industry registered a gain of nearly 15 per cent.

## GROUP A—NEW ENGLAND STATES

*(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.)*

(Data reported by 35 companies whose sales constitute approximately 82% of the total sales of gas in the New England States.)

| | *Month of April* | | | *Four Months Ending April 30th* | | |
|---|---|---|---|---|---|---|
| | *1930* | *1929* | *Per cent Increase* | *1930* | *1929* | *Per cent Increase* |
| *Customers* | | | | | | |
| Domestic | 1,037,366 | 1,034,480 | 0.3 | | | |
| House Heating | 5,551 | 4,011 | 38.4 | | | |
| Industrial and Commercial | 37,492 | 38,163 | — 1.7 | | *See April* | |
| Miscellaneous | 391 | 209 | — | | | |
| Total (34 companies which segregate) | 1,080,800 | 1,076,863 | 0.4 | | | |
| Grand Total (35 companies) | 1,114,518 | 1,110,179 | 0.4 | | | |
| *Gas Sales (MCF)* | | | | | | |
| Domestic | 2,163,799 | 2,061,871 | 4.9 | 8,581,785 | 8,254,950 | 4.0 |
| House Heating | 344,352 | 234,054 | 47.1 | 1,754,264 | 1,279,845 | 37.1 |
| Industrial and Commercial | 604,673 | 611,795 | — 1.2 | 2,288,815 | 2,447,313 | — 6.5 |
| Miscellaneous | 24,967 | 26,150 | — | 115,389 | 115,522 | — |
| Total (34 companies which segregate) | 3,137,791 | 2,933,870 | 6.9 | 12,740,253 | 12,097,630 | 5.3 |
| Grand Total (35 companies) | 3,228,229 | 3,018,928 | 6.9 | 13,119,080 | 12,448,558 | 5.4 |
| *Revenue (Dollars)* | | | | | | |
| Domestic | 2,808,764 | 2,692,153 | 4.3 | 11,159,255 | 10,758,980 | 3.7 |
| House Heating | 281,179 | 196,860 | 42.8 | 1,414,388 | 1,032,041 | 37.0 |
| Industrial and Commercial | 562,792 | 614,587 | — 8.4 | 2,167,436 | 2,483,530 | —12.7 |
| Miscellaneous | 16,661 | 20,524 | — | 73,457 | 86,294 | — |
| Total (34 companies which segregate) | 3,669,396 | 3,524,124 | 4.1 | 14,814,536 | 14,360,845 | 3.2 |
| Grand Total (35 companies) | 3,769,653 | 3,619,409 | 4.2 | 15,222,918 | 14,750,690 | 3.2 |
| *Gas Produced and Purchased (MCF)* | | | | | | |
| *Gas Produced* | | | | | | |
| (a) Water Gas | 1,497,089 | 1,424,797 | 5.1 | 6,284,438 | 6,176,592 | 1.7 |
| (b) Coal Gas | 730,298 | 716,042 | 2.0 | 3,150,296 | 2,943,050 | 7.0 |
| (c) Oil Gas | —— | —— | — | 438 | —— | — |
| (d) Coke Oven Gas | 361,099 | 299,090 | 20.7 | 1,474,980 | 1,163,981 | 26.7 |
| (e) Total Gas Produced | 2,588,486 | 2,439,929 | 6.1 | 10,910,152 | 10,283,623 | 6.1 |
| Coke Oven Gas Purchased | 749,304 | 706,698 | 6.0 | 2,944,287 | 2,783,305 | 5.8 |
| Total Gas Produced and Purchased | 3,337,790 | 3,146,627 | 6.1 | 13,854,439 | 13,066,928 | 6.0 |

NOTE: Of the thirty-five reporting companies, thirty-four segregate customers, sales and revenue while one company reports only totals. The data shown for the domestic, house heating and industrial-commercial classifications are based only on the reports of the thirty-four companies which segregate items.

# American Gas Association Committee Chairmen

## 1929-30

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**Water Gas Committee**
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# Window Displays that Hold the Eye of Prospective Gas Appliance Buyer

PENNIES
merely pennies
PERFECT GAS REFRIGERATION COSTS ONLY 35 TO 70 A WEEK
FIRELIGHT AND WARMTH
REAL HEAT REQUIRES REAL FIRE . . A RADIANT GAS HEATER
DON'T RISK A POOR HEATED
THE GAS REFRIGERATOR

*Here Are Reproduced Photographs of a New Series of Window Display Layouts Which Have Been Making Appliance Sales for The Consolidated Gas Company of New York*

## Accurate Data Necessary For Selling

(Continued from page 325)

Clearly, in order to take full advantage of the data made available by the survey of heat uses and requirements, the salesman should have some means of making his recommendations in a form that will be free from the defects named. The ideal proposal should have these five characteristics:

1. First and foremost, it should be "sales-slanted—constructed so as to bring forcefully to the prospect's attention the over-all savings in production costs that he will derive from the proposed changes—and incidentally, to postpone discussion of costs until he has had time to grasp that point."
2. It should be easy and inexpensive for the salesman to prepare.
3. It should be concise, so that the salesman can present it as a whole to the prospect in a single interview.
4. It should be sufficiently complete so that the prospect will be able to understand the reasons behind the salesman's recommendations without having to interrupt the salesman's presentation.
5. It should be self-explanatory and free from unnecessary technicalities, and therefore, be easy for the prospect to read and understand.

As the last step in the procedure of the survey of heat uses and requirements, therefore, it is important for the salesman to put into the preparation of such a combined report or proposal an amount of effort commensurate to his work on the survey itself. Charts IV and V, supplied with the course, represent a composite of the proposal forms successfully used in several gas companies. Charts of this kind meet all the five requirements outlined above; and provide the salesman with a powerful tool for overcoming one of the basic difficulties in the selling of gas to industry.

All of the five charts which are provided with the course as a suggested basis for the survey of heat uses and requirements have the great advantage of being virtually self-explanatory to all who are conversant with their own production problem. This characteristic of simplicity makes Chart IV, which summarizes the essential data of the survey, easy to prepare.

Other features of the charted proposal which commends its idea to every industrial gas salesman are its conciseness, completeness, and clarity.

The use of the chart forms for the presentation of the facts avoid needless repetition. The type of written report heretofore in common use employed sentences and paragraphs to describe planned operation, or to make recommendations affecting production costs. The charted proposal, on the other hand, requires only a word or figure set down under the appropriate column heading. The labor of preparing this type of report and the time required for reading it, are thus both reduced to a minimum.

In spite of its relative brevity, the charted proposal presents in considerable detail, all the important conclusions which the salesman has drawn from the survey of heat uses and requirements, and on which he bases his recommendations. For ordinary situations, these facts provide the salesman with all the ammunition that he needs for his presentation. In the comparatively few cases where the prospect wishes to go into greater detail, the salesman can always refer to the Charts I, II, and III; but Chart IV contains the essential data for convincing the average prospect of the reasonableness of the salesman's suggestions.

The two qualities of conciseness and completeness in conjunction with the clear-cut arrangement of the charted proposal, make it easy for the average prospect to read and to understand. He does not have to wade through a mass of technical statements to get at the facts. He has it there before him on a single sheet of paper.

The charts, carefully devised as they are, cannot operate solely by themselves. They are supplementary tools for the salesman—useful only to the extent and in the way they are put into practice. Therefore, the salesman must first make sure that he understands their purpose and arrangement. The procedure for handling the charts effectively is explained in the A. G. A. Course in Industrial Gas Salesmanship. The course takes the salesman by easy stages over the route he is expected to travel, from the moment when he makes his first call on the prospect in order to draw out the necessary information, through to the point where he submits his proposal and makes a compelling bid to close the sale. He is shown how to handle all sorts of situations that might arise—how to get around obstacles that stand in the way of his objective, and how to make the A. G. A. charts a serviceable instrument for developing business. Every page of the units issued thus far is full of practical, usable ideas and suggestions, all based on actual experience in the industrial gas field.

The course was written with a view to training each individual. For that reason, personal check sheets are provided; case problems are included for each subscriber to answer and apply what he has learned; and group meetings are arranged so that each one taking the course has a further opportunity to practice skilful salesmanship under conditions of friendly competition.

## Preeminence of Gas in Heating Field

(Continued from page 291)

the total United States production of electricity in 1929."

Bringing this comparison down to a single concrete example, that of the Mary Sudik oil and gas well, which was brought in near Oklahoma City, recently, with a flow of gas of 100,000,000 cu.ft. daily, the equivalent electrical energy would require an electric plant operating on a 100 per cent load-factor basis, 365 days a year, with an installed capacity of 1,400,000 kilowatt hours. This would amount to nearly 5 per cent of the capacity of the entire electric light and power industry of this country and would exceed the total generating capacity of the electric plants of Greater New York.

In our own state, New York, continuing this comparison of energy production, the total natural and manufactured gas production for 1929 was 117,821,000,000 cu.ft., of an equivalent energy expressed in kilowatt hours of 22,500,000,000 kilowatt hours. The total kilowatt hours produced by electric light and power plants in the state of New York for 1929 was only 13,030,000,000. The natural gas production of New York State in 1929—and New York is not considered much of a natural gas producer—expressed in kilowatt hours equivalents was 5,200,000,000 while the entire hydro-electric production of electrical energy was only 5,573,000,000 kilowatt hours.

The gas industry sold in 1929 nine times the energy, but received only 45 per cent as much in revenue as the electric industry.

Our revenues per unit of energy sold were only one-fifteenth of what electric revenues per unit of energy were for 1929.

The program of the gas industry is going steadily forward. As I have said, plans are already in process for the continued study and research in the problems of production, transportation, distribution and utilization—the improvement of gas-consuming appliances that they may deliver an even greater degree of efficient service; and in conjunction with the continued improvement of the physical factors of the business, the gas industry, is committed to a most intensive study of the problems of marketing along aggressive lines.

# Associations Affiliated with A. G. A.

**Canadian Gas Association**
Pres.—Kenneth L. Dawson, Nova Scotia Light & Power Co., Ltd., Halifax, N. S.
Sec.-Tr.—G. W. Allen, 21 Astley Avenue, Toronto.

**Colorado Utilities Association**
Pres.—H. S. Robertson, Denver Tramway Corp., Denver, Colo.
Sec.-Tr.—O. A. Weller, Public Service Co. of Colo., Denver, Colo.

**Empire State Gas and Electric Association**
Pres.—William J. Welsh, New York & Richmond Gas Co., Staten Island, New York.
Chairman Gas Section—M. F. Clement, Rockland Light & Power Co., Middletown, Ind.
Sec.—C. H. B. Chapin, Grand Central Terminal, New York, N. Y.

**Illinois Gas Association**
Pres.—H. T. East, Public Service Company of Northern Illinois, Chicago, Ill.
Sec.-Tr.—George Schwaner, 305 Illinois Mine Workers Bldg., Springfield, Ill.

**Indiana Gas Association**
Pres.—C. L. Kirk, Citizens Gas Co., Indianapolis, Ind.
Sec.-Tr.—F. W. Budd, Central Indiana Gas Co., Muncie, Ind.

**Michigan Gas Association**
Pres.—A. I. Snyder, Detroit City Gas Co., Detroit, Mich.
Sec.-Tr.—A. G. Schroeder, Grand Rapids Gas Light Co., Grand Rapids, Mich.

**Mid-West Gas Association**
Pres.—J. M. Drabelle, Iowa Ry. & Lt. Corp., Cedar Rapids, Iowa.
Sec.-Tr.—Roy B. Searing, Sioux City Gas & Electric Co., Sioux City, Iowa.

**Missouri Association of Public Utilities**
Pres.—H. M. Patton, Union Electric Light & Power Co., St. Louis, Mo.
Sec.-Tr.—F. D. Beardslee, 315 N. 12th St., St. Louis, Mo.
Asst. Sec.—Jesse Blythe, 103 West High St., Jefferson City, Mo.

**New England Gas Association**
Pres.—H. Vittinghoff, Stone & Webster, Inc., Boston, Mass.
Exec. Sec.—C. D. Williams, 41 Mount Vernon St., Boston, Mass.
Chairman Operating Div.—A. S. Hall, Springfield Gas Light Co., Springfield, Mass.
Secretary Operating Division—Paul Buchanan, Hartford Gas Co., Hartford, Conn.
Chairman Sales Div.—J. H. Sumner, Cambridge Gas Light Co., Cambridge, Mass.
Sec.-Tr. Sales Div.—A. M. Slattery, Hoffman Heater Co., Boston, Mass.
Chairman Industrial Div.—L. E. Wagner, Providence Gas Co., Providence, R. I.
Sec.-Tr.—Industrial Div.—Charles S. Hilton, Pawtucket Gas Co., Pawtucket, R. I.
Chairman Acctg. Div.—Burton Smart, Portland Gas Light Co., Portland, Me.
Sec.-Treas. Acctg. Div.—Otto Price, Boston Consolidated Gas Co., Boston, Mass.
Chairman Manufacturer Div.—J. D. Taylor, Walker & Pratt Mfg. Co., Boston, Mass.
Sec.-Treas. Manufacturers Div.—J. H. McPherson, 250 Stuart St., Boston, Mass.

**New Jersey Gas Association**
Pres.—Chester Grey, Atlantic City Gas Company, Atlantic City, N. J.
Sec.-Tr.—H. E. Cliff, Public Service Electric & Gas Co., Newark, N. J.

**Ohio Gas and Oil Men's Association**
Pres.—L. K. Langdon, Union Gas & Electric Co., Cincinnati, Ohio.
Sec.-Tr.—Wm. H. Thompson, 811 First National Bank Bldg., Columbus, Ohio.

**Oklahoma Utilities Association**
Pres.—T. H. Steffens, Sand Springs Railway Co., Sand Springs, Okla.
Mgr.—E. F. McKay, 1020 Petroleum Bldg., Oklahoma City, Okla.

**Pacific Coast Gas Association**
Pres.—F. H. Bivens, Southern Counties Gas Co., Los Angeles, Calif.
Mang. Dir.—Clifford Johnstone, 447 Sutter St., San Francisco, Calif.

**Pennsylvania Gas Association**
Pres.—E. G. Boyer, Philadelphia Electric Co., Philadelphia, Pa.
Sec.-Tr.—Frank W. Lesley, Pennsylvania Gas & Electric Co., York, Pa.

**Pennsylvania Natural Gas Men's Association**
Pres.—Geo. E. Whitwell, Equitable Gas Co., Pittsburgh, Pa.
Sec.-Tr.—B. H. Smyers, Jr., 435 Sixth Ave., Pittsburgh, Pa.

**Southern Gas Association**
Pres.—A. J. Goss, Chattanooga Gas Co., Chattanooga, Tenn.
Sec.-Tr.—G. H. Schlatter, Birmingham Gas Co., Birmingham, Ala.

**Southwestern Public Service Association**
Pres.—Knox Lee, Southwestern Gas & Electric Co., Marshall, Texas.
Chairman Gas Section—Frank L. Chase, Lone Star Gas Co., Dallas, Texas.
Sec.—E. N. Willis, c/o University Club, Dallas, Texas.

**The Public Utilities Association of Virginia**
Pres.—C. B. Short, Roanoke Railway and Electric Co., Roanoke, Va.
Sec.— C. O. Robertson, P. O. Box 537, Roanoke, Va.

**Wisconsin Utilities Association**
Pres.—M. H. Frank, Wisconsin Power & Light Co., Madison, Wis.
Exec. Sec.—J. N. Cadby, 105 Wells St., Milwaukee, Wis.

Twelfth Annual Convention of the American Gas Association
Atlantic City, N. J. - - - October 13-17, 1930

# Employment Bureau

## SERVICES REQUIRED

Experienced industrial gas salesmen for large operating gas company. **0163.**

Salesmen to sell gas to industries. Experienced men preferred. **0164.**

Sales engineers to handle line of motor operated valves, low temperature pressure and combustion safety controllers. Men 25 to 35 years with college training preferred. Familiarity with process control field advantageous. **0167.**

Industrial gas sales engineers by Public Utility in Middle West. College graduates in engineering courses preferred. Please state age, experience, education, and salary expected. **0169.**

One, two or three salesmen familiar with housheating; would like to interview those who have held similar positions with gas companies. Salary according to experience and ability. **0171.**

Experienced gas appliance salesmen wanted by Holding Company for service in small gas plants. Only men who can sell and are ambitious are desired. Salary and commission. Write full qualifications. **0172.**

Young engineer to supervise servicing of heating boilers, gas refrigerators, water heaters and similar appliances; a technical man who can learn the practical end or who is already familiar with it, and who also will understand the theory of the gas refrigerator, etc. **0173.**

Rate specialist with accounting, legal and engineering knowledge. Experience and good personality essential; position requires traveling; salary commensurate with qualifications. Include references with application. **0174.**

## SERVICES OFFERED

Executive with successful organizing and technical experience wants to make a change. **316.**

Gas Engineer with technical education and over fifteen years' experience in the design, construction and operation of all types of coal carbonizing plants desires to make a connection where training and experience can be used to advantage. **320.**

Gas Sales Executive, now completing a successful three years' load building program of a large Middle West Natural Gas Company. Capable sales executive and organizer with a technical and legal training. **322.**

Sales Manager with gas and electric company or gas alone. Prefer Connecticut or New York State. Eighteen years' experience. **323.**

Over twenty years of experience with one public utility company in all angles of the gas industry are behind the writer of this advertisement. He has been Constructing and Operating Engineer on both Plant and Distribution work, Sales Manager, Advertising and Publicity Manager and a successful handler of employees and the public. He possesses good health and has the qualities of initiative, versatility, adaptability and promotion of goodwill. His natural talents are executive and managerial. He is not shooting at the stars, but desires a position of responsibility where his experience and wide range of activity will be of value to his employer. **324.**

Available, new business manager or executive's assistant. Age 35. Married. Graduate Engineer, with coal gas and water gas plant experience and successful industrial gas and housheating management experience in large companies. Have had ten year connection in aggressive companies in the gas industry. **325.**

Young man, 32, with eight years experience in number of combination companies, with single firm, desires position of Assistant to Executive. **327.**

Distribution, Plant or General Foreman with medium size or small gas plant. Twenty-five years experience in water gas manufacture and distribution work. Married. Good references. South preferred. **328.**

Manager-Engineer, technical man, nineteen years experience in coal and water gas operation, distribution, city and industrial plant design and construction; familiar with recent developments in production and modification of gases; now employed, desires change. **329.**

### CONFIDENTIAL SERVICE

A confidential service whereby those seeking men and those seeking positions may be brought together; a confidential classification form for recording qualifications and experience may be filed for use by A. G. A. Headquarters when furnishing information as to the availability of qualified executives, engineers, operators, salesmen and others.

The insertion of an advertisement on this page is a privilege of membership for which there is no charge; applications may be filed without advertising if desired.

Company and individual advertisers are requested to inform the Employment Bureau immediately a position has been filled or accepted; all advertisements should be received at A. G. A. Headquarters not later than the seventh of the month to insure insertion in the next issue.

*Typewrite letters and qualification record if possible.*

Technical and practical gas engineer now employed as manager of small property desires a position as production engineer over a group of properties. Capable of putting gas production and boiler plants on a money saving basis. **330.**

Experienced sales engineer specializing in design and sale of carbonization and auxiliary plant equipment. Good organizer, with analytical ability and wide acquaintance in Canada and United States. **332.**

Gas engineer having wide experience in all departments of business, construction, manufacturing, distribution, sales and appraisal —also knowledge of the sale and handling of by-products, and having executive experience desires connection as manager or superintendent or as engineer with holding company. Could handle combination gas and electric company. Can furnish best of references. **333.**

Industrial and housheating engineer with nineteen years experience in the natural gas industry; capable of compiling manuals and organizing departments with proven results; desires position as such, or manager of small property. **334.**

Technical man, age 34, married. Eleven years experience in laboratory and plant control of coal and water gas manufacture. Open for position as chemist, assistant to superintendent or foreman. **335.**

Chemical Engineer with Master's degree, experienced research man in engineering and public utility problems, desires summer employment. **337.**

Chemical engineer with eight years' experience with large public utilities on gas plant operation, and design of gas and power plant equipment. Experienced in handling men. Desires place as assistant to executive, or industrial sales. Would consider service and sales with equipment manufacturer. Married and now employed. Can leave on short notice. **338.**

A young executive with several years' experience in rates, sales promotion, advertising and public relations work is now available. **339.**

Engineer, M.S. degree, 10 years' experience in coal processing and allied problems. Particular experience in technical and economic phases of low-temperature carbonization and complete gasification. **340.**

Gas Engineer—college education, with nine years' experience in transmission and distribution of manufactured and natural gas. **341.**

Gas sales engineer of broad experience in industrial and housheating fields. Age 29, married. Capable of developing new field, conducting surveys, and designing equipment for special heating processes; familiar with domestic appliances. Desires position as manager of department or assistant to executive. **342.**

Meter shop superintendent with thorough knowledge of all types of meters; can produce results without disorganizing other personnel and offers best of references. **344.**

Engineer—technical graduate with twelve years' experience as cadet engineer, plant foreman, manager and engineer desires new connection—40 years of age, married. **345.**

Successful industrial engineer of several years broad experience; also technically trained in production and distribution; college graduate. **346.**

Industrial sales engineer, 33, with managerial sales experience in natural, manufactured and mixed gas territories. In charge of industrial and commercial departments. Has designed many special furnaces and laid out own installations. Can furnish creditable references from previous employers. Employed at present as commercial manager and desires change to industrial work in Middle West or East. **347.**

1928 Graduate with degree of M.E. desires position as assistant to engineer or minor executive of gas company, or company manufacturing gas apparatus. **348.**

New Business or Merchandise Manager, 36 years of age, desires connection with a gas or combination utility. Ten years of highly diversified experience in utility commercial efforts covering general merchandise sales promotion, advertising and publicity, commercial accounting methods, new business promotion, etc. **349.**

Eastern Sales Manager or Sales Representative of gas appliances of merit and reasonable demand. Due to many years in the business I have a large circle of acquaintances who would assist me in forming contacts. **350.**

Engineer thoroughly trained in construction, appraisal, depreciation, gasoline absorption and research studies, desires connection where advancement will be earned by productive efforts. Twelve years productive service and experience. **351.**

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